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PESTICIDES ABSTRACTS (formerly Health Aspects of Pesticides Abstract Bulletin) is a monthly publication of the Technical Services Division of the Office of Pesticide Programs, Environmental Protection Agency.

The purpose of this publication is to foster current awareness of the major worldwide literature pertaining to the effects of pesticides as defined in the Table of Contents. The publication represents a monthly review of more than 2,000 primary and secondary sources. A list of periodicals from which articles have been abstracted appears annually in the January issue. Subjects and authors of abstracted articles are cross-referenced in quarterly and annual indexes. Reprint requests should be directed to the author of the complete article.

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77-0966. Hougardy, A. (Author address not given). **Congres de la Societe Francaise d'Hygiene, de Medicine Publique et de Genie Sanitaire. [Meeting of the French Society for Hygiene, Public Health, and Sanitation.]** *Arch. Belg. Med. Soc. Hyg. Med. Trav. Med. Leg.* 33(9/10): 525-541; 1975. (15 references) (French)

Pollution chians, their interference with human health, their epidemiology, and combat strategies are discussed in a meeting report on the interactions between pollutants. Organochlorine pesticide pollution is a prime example of the pollution of the agricultural food chain. Cow's milk is polluted, especially with lindane, through the cow's ingestion of contaminated foods such as sugar beets. The cellular study of nutritional damage caused by pesticides, organochlorine, and organophosphate substances should focuse on effects on the redox potential. The French environmentalists are attempting to conciliate environmental policies with industrial growth and land uses, and to extend environmental policies to an international level.

77-0967. Anonymous. **I Nostri alimenti e la nostra salute. Sintesi in 25 punti sulla protezione delle derrate alimentari. [Our food and our health. Twenty five points on the protection of foodstuffs.]** *Ig. Sanita. Pubblica* 32(1-2): 34-37; 1976. (Italian)

As a result of treatment and preservation foods contain additives, residues, and contaminants. The health risks must be determined, as the consumption of chemically contaminated foods can result in severe and sometimes irreversible damage. In the 1960s, many countries had epidemics of food poisoning as the result of accidental contamination of flour with endrin and parathion. Daily acceptable doses, thresholds, effects, and alternatives must be determined and the information disseminated on an international level.

77-0968. Anonymous. **La CEE per Seveso. [The EEC for Seveso.]** *Inquinamento* 18(10): 72; 1976. (Italian)

Following the Seveso incident, the European Commission made itself available to aid Italy in controlling pollution from the toxic substances emitted at the time of the incident. The Ispra Establishment of the Joint Research Center researched TCDD, its toxicity, teratologic effects, metabolism, and mode of contamination. Ispra also also provided the apparatus necessary to determine local meteorological conditions. The Division of Sanitation and Safety of the European Commission has been acting as intermediary between the Italian authorities and toxicologists and laboratories to facilitate the transmission of information.

77-0969. Truhaut, R. (Fac. Sci. Pharm. Biol. Univ. Rene Descartes, Paris V, 75006 France). **Apercus sur les dangers de l'ere chimique. [Hazards of the age of chemicals.]** *J. Pharm. Belg.* 31(2): 117-138; 1976. (10 references) (French)

In an extensive report on the hazards of chemicals today, some very general concepts on toxicity, absorption, and interactions are presented, followed by the presentation of examples of toxicity risks in a number of fields. The report concludes with general principles of prevention against chemical hazards. Pesticides are used as examples of occupational exposure to chemicals. While exposure may be the result of a plant accident, it is usually a long-term daily process. Exposure to industrial and agricultural chemicals is known to result in numerous diseases, including cancer. Pesticides may also affect individuals through the food chain. Organochlorine pesticides are especially persistent and cause nerve and liver damage while organomercurial fungicides cause kidney and nerve disorders. Mineral derivatives of arsenic, selenium, acetylamino 2-fluorene, aramite, and amitrole have had carcinogenic effects on experimental animals.

77-0970. Korotkova, O. A. (All-Union Scientific Research Institute of Chemical Plant Protective Agents, USSR). **Pestitsidy i okruzhaiushchaia sreda: proizvodyne aromaticheskikh odnoosnovnykh karbonovykh kislot. [Pesticides and the environment: derivatives of aromatic monobasic carboxylic acids.]** *Khim. Sel. Khoz.* 14(11): 38-41; 1976. (26 references) (Russian)

Studies on the persistence, degradation and toxicity of aromatic monobasic carboxylic acid derived pesticides are reviewed. While the acute oral toxicity of these pesticides is fairly low, they are problematic environmentally because they are persistent in the soil, penetrating into deep layers, whereby they are also a source of groundwater contamination. The acute oral LD50 values, determined for laboratory animals, are 1,000-6,800 mg/kg for dichlobenil, 700-1,500 mg/kg for trichlorobenzoic acid, 1,000-1,100 mg/kg for dicamba, 3,500-5,500 mg/kg for amiben, 110 mg/kg for ioxynil, 190 mg/kg for bromoxynil, 1,700-1,800 mg/kg for fenac, and 700-2,500 mg/kg for diphenamid. The nitriles are usually decomposed in the soil by hydrolysis to amides, which may persist for a very long time. The esters of amiben and dicamba are hydrolyzed in the soil very rapidly by *Bacillus cereus* var. *mycoides*, *B. megatherium*, and *B. subtilis*. Chlorobenzilate and chloropropylate are decomposed by *Rhodotorula gracilis*. Photolysis plays an important role in the degradation of aromatic carboxylic acids. These pesticides are taken up plants from the soil, and accumulated especially in the leaves.

77-0971. Zedda, S.; Cirla, A. M.; Sala, C. (Serv. Med. Lavoro, Ospedale di Lecco, Lecco, Italy). **Contaminazione accidentale de tetrachlorodibenzoparadiossina. Considerazioni sull'episodio I.C.M.E.S.A. [Accidental contamination by TCDD. The ICMESA incident.]** *Med. Lav.* 67(5): 371-378; 1976. (26 references) (Italian)

Tetrachlorodibenzo-*para*-dioxin (TCDD) is very stable, highly lipophilic, and very toxic. It is produced

during the synthesis of substances such as chlorophenols. It is formed by nucleophilic condensation when an orthochlorophenol or its salts are heated over 200°C. Its pathogenic effects in rat, rabbit, chicken, and hamster include severe liver damage, early thymic hypertrophy, and degeneration or hemorrhaging of the kidney, thyroid, adrenal glands, lymph, glands, myocardium, intestine, and brain. Cellular immune inhibition, lymphocytopenia, and a decrease in immunoglobulins have been observed in mouse and hamster. TCDD is very embryotoxic, causing either teratogenic damage, death of the embryo, or stunted fetal growth even at very low concentrations (e.g. 2 μg/kg in the mouse). It induces numerous microsomal enzymes of the mono-oxygenase and aryl hydroxylase groups and is 100,000 times more potent than phenobarbital. Data on man come mainly from occupational exposure. Symptoms include chloracne, skin alterations, hair loss, central nervous system disorders, hepatic dysfunction, cardiac arryhthmia, thyroid and pancreatic functional alterations, and neurasthenic syndrome. These symptoms can develop up to two years after absorption. At Seveso, where trichlorophenol was manufactured, an explosion created temperature conditions ideal for the formation of TCDD. About 5,000 people in the area and 170 workers were exposed. There have been reported of 12 cases of chloracne in directly contaminated workers, 29 cases of hepatic insufficiency, 28 cases of chronic bronchitis, 17 cases of arterial hypertension, 9 cases of coronary insufficiency, 8 cases of muscular asthenia, and 3 cases of reduced libido. Gamma-GT and alkaline phosphatase were significantly altered in 37 and 32 cases respectively. Long-term effects have yet to be determined.

77-0972. Dally, S. (Clin. Toxicol., Hopital Fernand Widal, F 75475 Paris Cedex 10 France). **Toxicite de la "Dioxine".** [**Toxicity of dioxin.**] *Nouv. Presse Med.* 5(41): 2803-2804; 1976. (16 references) (French)

TCDD (2,3,7,8-tetrachlorodibenzo-*p*-dioxin) is the most toxic of the chlorodioxin compounds. It is insoluble in water, does not translocate in the soil, is not absorbed by plants, and is very persistent. In vertebrates, it is absorbed by the skin and digestive tract. Its metabolism is very slow. In the rat, it produces a lymphatic and thymic atrophy, digestive ulcers, and hepatic necrosis and a single dose of 0.2 mg/kg will cause weight loss. TCDD has also produced malformations in the rat and hamster. It is probably a carcinogen as it is a powerful inducer of the hepatic arylhydrocarbon hydroxylase enzyme in the adult and fetal rat at 0.0025 mg/kg. In man, its better known effect is chloracne, observed in men working in trichlorophenol synthesis plants. Hepatic lesions have also been noted in man. Long term effects are little known. In Vietnam, a significant increase in the incidence of liver tumors (from 3 to 9%) and of congenital malformations during the 1962-1968 period, has been attributed to the extensive use of defoliants containing traces of dioxin during the Indochina war.

77-0973. Anonymous. **A Propos de l'accident de Seveso.** [**The Seveso incident.**] *Pollut. Atmos.* 18(71): 221-222; 1976. (French)

At the Seveso plant which manufactured trichlorophenol, an explosion created temperature conditions ideal for the formation of dioxin. Dioxin (2,3,7,8 tetrachlorodibenzo-*p*-dioxin) is very toxic; it has an LD50 of 0.0006 mg/kg for the guinea pig. Its somatic effects include chloracne, hepatic lesions, and gastric and vascular alterations. Administered orally to pregnant rats at 0.000125 mg/kg/day between days 6 and 15 of gestation, dioxin produces visceral anomalies in embryos. With regard to humans, an increase in abortions, malformations and liver tumors in Vietnam has been attributed to the massive use of defoliants containing traces of dioxin in 1970. TCDD is also a powerful induce of the enzyme, aryl hydrocarbon hydroxylase which is active in the metabolism of polycyclic hydrocarbons. There are no specific antidotes, and risks of exposure are increased by the persistence of dioxin in the soil.

77-0974. Jaubert, A. **Le Poison de Seveso.** [**Poison of Seveso.**] *Recherche* (71): 868-870; 1976. (18 references) (French)

Knowledge of dioxin has come to light only recently through the discovery of the hazards of hexachlorophene and 2,4,5-T, which both contain dioxin in trace amounts. Dioxin is easily synthesized through the pyrolysis of 2,4,5-T and its derivatives. Dioxin is 500 times more toxic than strychnine, highly stable, nondegradable by bacteria, and can persist in the soil or organic debris for years. It is easily absorbed by the skin and cells, and is transported by the blood lipids. It induces the synthesis of microsomal hydroxylases and inhibits the synthesis of hepatic arginase. First reactions to dioxin exposure are cutaneous (chloracne) and pulmonary (hemoptysis). It also causes thymic hypertrophy, leukocytosis, and an increase in polynuclear neutrophils. Severe hepatic lesions and necrosis have also been observed in animals. A significant increase in liver cancer in Vietnam has been attributed to the extensive use of defoliants containing dioxin in 1970.

77-0975. Murai, T. (Natl. Inst. Agric. Sci., Kita-ku, Tokyo, Japan). **Photodecomposition of *O*-ethyl *S*,*S*,*S*-diphenyl phosphorodithiolate (edifenphos).** *Agric. Biol. Chem.* 41(1): 71-77; 1977. (14 references)

The photodecomposition of *O*-ethyl *S*,*S*-diphenyl phosphorodithiolate (edifenphos) under laboratory ultraviolet light was investigated by using the ^{35}S-labeled compound. Under catalysis by ultraviolet light, edifenphos was hydrolyzed to *O*-ethyl *S*-phenyl hydrogen phosphorothiolate, *S*-phenyl dihydrogen phosphorothiolate, ethyl dihydrogen phosphate and finally phosphoric acid. The main step of the photodecomposition was cleavage of the P-S bond at the initial stage of irradiation. On irradiation in film and aqueous solution, phenylthio radicals attributed to the cleavage of the P-S linkage were immediately oxidized to form benzensulfonic acid and sulfuric acid. In hexane solution, some phenylthio radicals reacted to give diphenyl disulfide, diphenyl sulfide, 1-methylpentyl benzenesulfinate and 1-methylpentyl benzenesulfonate. (Author abstract by permission)

77-0976. Leidy, R. B.; Domanski, J. J.; Haire, P. L.; Sheets, T. J. (North Carolina State Univ., Raleigh, NC 27607). **Effects of weathering and flue-curing on methomyl residues on tobacco.** *Arch. Environ. Contam. Toxicol.* 5(2): 199-206; 1977. (12 references)

A replicated field experiment was conducted at two locations to determine the disappearance of methomyl from flue-cured tobacco. Immediately after application, methomyl residues were 88 and 113 ppm at Clayton and 44 and 105 ppm at Reidsville, respectively, for 0.56 and 1.12 kg/ha application rates. After 5 days these levels dropped to 0.7 and 2.8 ppm at Clayton and 1.4 and 4.1 ppm at Reidsville. At 9 days after application, 99% of the methomyl had disappeared at both locations. Losses of methomyl during flue-curing averaged 96% over locations, rates of application, and times of harvest, compared to an average loss of 98% due to weathering in the field for 5 days. The disappearance of methomyl during the curing process was approximately the same for both locations. (Author abstract by permission)

77-0977. Coppedge, J. R.; Bull. D. L.; Ridgway, R. L. (Cotton Insects Res. Lab., Agric. Res. Serv., U.S. Dep. Agric., College Station, TX 77840). **Movement and persistence of aldicarb in certain soils.** *Arch. Environ. Contam. Toxicol.* 5(2): 129-141; 1977. (13 references)

When the rate of movement and the persistence of aldicarb in 4 types of soils were investigated in laboratory and field studies some leaching was detected in coarse sand; however, leaching was quite limited in clay loam and muck soils. These data indicated that aldicarb degraded quite rapidly in the selected soil and most of the applied radioactivity volatilized from these soil columns as $^{14}CO_2$. The evolution of $^{14}CO_2$ from the treated soil suggested severe degradation of the aldicarb molecule and consequently provided indirect evidence against the accumulation of significant quantities of toxic metabolites in the soil types evaluated. Under field conditions this toxicant appeared to have a half-life of about 7 days in loam soil. (Author abstract by permission)

77-0978. Drecenkar, V.; Fink, K.; Stipcevic, M.; Tkalcevic, B. (Inst. Med. Res. Occup. Health, Zagreb, Yugoslavia). **The fate of pesticides in aquatic environment. II. Hydrolysis of dichlorvos in a model system and in river water.** *Arh. Hig. Rada Toksikol.* 27(4): 297-305; 1976. (6 references)

An attempt has been made to elucidate the unusually fast decay of dichlorvos in the water of the Kupa river as compared to the behavior of this pesticide in other river waters. The effects of pH, temperature, different ion species, organic components and concentration of dichlorvos on the decay rate were tested in a model system. The concentration of hydrogen ions and temperature were found to be rate determining. Different ion species could have a considerable effect on the rate of hydrolysis of dichlorvos but only if present in large quantities.

77-0979. Holdrinet, M. V. H.; Braun, H. E.; Frank, R.; Stopps, G. J.; Smout, M. S.; McWade, J. W. (Prov. Pestic. Residue Test. Lab., Ontario Min. Agric. Food, Guelph, Ontario). **Organochlorine residues in human adipose tissue and milk from Ontario residents, 1969-1974.** *Can. J. Public Health* 68: 74-80; 1977. (12 references)

A total of 448 human adipose tissues from autopsies and 101 human milk samples were collected in Ontario from 1969 to 1974 and analyzed for organochlorine insecticides, polychlorinated biphenyls (PCB) and hexachlorobenzene (HCB). Adipose samples from residents of the southern region had slightly higher ΣDDT residues than samples from residents of the rest of the Province in 1969 (7.10 vs 5.16 ppm) and 1972 (5.56 vs 3.46 ppm); by 1973 no difference was apparent. To investigate the effect of Provinical restrictions on the use of aldrin and DDT the residue data were grouped in three 2-calendar-year intervals. A decline in ΣDDT (7.59 to 5.67 to 3.69 ppm) and dieldrin (0.17 to 0.13 to 0.09 ppm) was noted from 1969-70 to 1971-72 to 1973-74; PCB and HCB remained unchanged. The data showed a tendency towards increased ΣDDT residue with increasing age. This was not obvious for dieldrin. Amounts of DDT metabolites changed with time, i.e., the percentage *p,p'*-DDE in ΣDDT increased and the percentage *p,p'*-DDE and *p,p'*-DDT in ΣDDT decreased. From 1969 to 1974 a decline in ΣDDT (3.48 to 1.39 ppm) and dieldrin (0.09 to 0.04 ppm) was

77-0980. Kahn, S. U. (Chem. Biol. Res. Inst., Res. Branch, Agric. Canada, Ottawa, Ontario, Canada). **Adsorption of dyfonate (*O*-ethyl-*S*-phenyl ethylphosphonodithioate) on humic acid.** *Can. J. Soil Sci.* 57(1): 9-13; 1977. (15 references)

The adsorption of Dyfonate (*O*-ethyl-*S*-phenyl

ethylphosphonodithioate, fonofos) was studied on humic acid (HA) saturated with various cations (Fe, Al, Cu, Zn, Co, Mn, Ni, Ca, Mg, and H ions). The amount of Dyfonate adsorbed was affected by the cation with which the HA was saturated. The adsorption process could be described empirically by a Freundlich-type isotherm. The *K* and 1/n constants of the Freundlich equation decreased and increased, respectively, with increase in temperature. The data suggest a physical type of adsorption. (Author abstract by permission)

77-0981. Stewart, D. K. R.; MacLean, A. A.; Kimball, E. R. (Res. Stn., Agric. Canada, Kentville, Nova Scotia, Canada). **Insecticide residues in bottom sediments of two New Brunswick streams draining agricultural land.** *Can. J. Soil Sci.* 57(1): 15-20; 1977. (14 references)

Bottom sediments from two streams draining agricultural land in New Brunswick were analyzed for organochlorine and organophosphorus insecticide residues. Most samples contained appreciable quantities of DDT plus metabolites (up to a total of 2.07 ppm), about one-third contained smaller quantities of endrin (up to 0.45 ppm), and approximately one-fifth contained dieldrin (up to 0.01 ppm). No other organochlorine and organophosphorus insecticides were detected. The highest residue levels were found in the watershed with the more intensive agricultural production and in proximity to fields producing intertilled crops. (Author abstract by permission)

77-0982. Pokorny, J.; Culikova, H. (Inst. Hyg. Epidemiol., Prague, Czechoslovakia). **K perzistenci nekterych herbicidu ve vidnim prostredi. [The persistence of some herbicides.]** *Cesk. Hyg.* 22(1): 18-23; 1977. (11 references) (Czech)

Model experiments were performed to observed the persistence of some frequently applied herbicides in the surface water. They included a triazine (simazine), chlorophenoxyfatty acids (MCPA, Amiten), heterocyclic compounds (paraquat, amitrole), and a three-component preparation Primatol based on triazines and amitrole. In the artificially contaminated water in the range of 1-5 mg of active substance per liter, the levels were observed over a 20-day cycle, supplemented by oxygen consumption and titres of ammonization, denitrification and nitrification bacteria. A relatively high decrease of the active substance was observed for MCPA (by 72%), simazine (by 60%), and Amiten (by 50%), and was accompanied by a strong decrease or even depletion of oxygen in the environment and development of denitrification and ammonization bacteria. In other cases, especially in preparations based on heterocyclic compounds, the decrease of the active substance was lower (20-30%) as was the oxygen consumption and development of the above mentioned bacterial groups. All the preparations observed, however, suppressed the development of nitrifying bacteria.

77-0983. Lue, K. Y. (Mississippi State Univ., University, MS). **Decomposition properties of the mirex fire ant bait and its ecological effects on selected biotic systems.** *Diss. Abstr. Int. B* 37(7): 3246-3247; 1977.

The decomposition pattern of the fire ant bait and the leaching of the pesticide mirex from the bait in three types of environments (i.e., on the ground, in the soil and in the pond) were investigated by means of the nylon litter bag method for a period of one year. The bait itself proved to be very persistent. After one year of decomposition in the field, about 75% of bait material remained in the bags exposed on the ground, 60% in the soil and 25% in the pond. Mirex residues recovered from the decomposed baits were very stable. The bait in the pond lost the largest amounts of mirex, in the soil next and on the ground last. The rate of mirex loss was slower during fall and winter. The effects of technical grade mirex and 4X fire ant bait to selected organisms (*Hydra sp.*, *Armadillidium vulgare* and *Oxidus gracilis*) and soil microcommunity were tested by monitoring the metabolic changes (oxygen consumption) and toxicity (rates of mirex poisoning and mortality) to organisms. Symptoms of mirex poisoning (e.g., hypersensitivity, tremors, coiled body etc.,) were observed on three species of test organisms when exposed to mirex environments. The toxicities of the fire ant bait decomposed in situ for different periods of time (12, 9, 6, 3 and 0 months) to *A. vulgare* and *O. gracilis* were higher than the undecomposed one. Based on KD values the toxicity of mirex to soil macroarthropods was very high. Metabolic changes were observed in *A. vulgare* and *O. gracilis*. Mirex at lower concentration (100 ppm) also increased the oxygen uptake of the soil microcommunity. The uptake in the soil (100 g) mixed with 1.0 g of bait (toxic or non-toxic) were much higher than the soil mixed with 0.1 g and 0.01 g of bait. (Author abstract by permission, abridged. Copies of the thesis are available from University Microfilms, order No. 76-30,063).

77-0984. Likhtman, T. V.; Tsetlin, V. M. (All-Union Sci. Res. Inst. Disinfect. Steril., Moscow, USSR). **Raschet koeffitsientov diffuzii pestitsidov v vozdukhe. [Calculation of the diffusion coefficients of pesticides in air.]** *Gig. Sanit.* (7): 76-79; 1976. (3 references) (Russian)

The diffusion coefficients and diffusion currents of various pesticides were calculated on the basis of the Fickian diffusion theory. The diffusion coefficients were fairly close to each other, being in the same order of magnitude. They ranged from 0.0137 to 0.0816 cm^2/sec at 20°C for such pesticides as neopynamin (tetramethrin), methyl demeton, demeton, diazinon, malathion, methylmercaptophos, parathion, fenthion, DDT, dimethoate, trichlorfon, ronnel, fenitrothion, methyl parathion, naled, octamethyl, heptachlor, propoxur, dichlorvos, dieldrin, and lindane. The differences between the diffusion currents were much greater; the diffusion currents ranged from 0.0087 x 10^7 mg/m^2 sec (neopynamin) to 6,900 x 10^7 sec (dichlorvos) (DDVP).

77-0985. Egorova, I. P.; Novikov, A. F.; Karaseva, E. V.; Gromyko, S. G.; Penskaia, G. S. (Taganrog Munic. Sanit. and Epidemiol. Stn., Taganrog, USSR). **Nekotorye dannye ob itogakh opredeleniia iadokhimikatov v sanitarno-khimicheskoi laboratorii Taganroga. [Results of determination of pesticides in the Taganrog Public Health Laboratory.]** *Gig. Sanit.* (10): 98-100; 1976. (Russian)

Results of systematic pesticide residue analyses in foods of vegetable and animal origin at the Taganrog Public Health Laboratory are presented. One hundred and seventeen of the 496 foods of animal origin investigated during the 1964-1973 period contained organochlorine pesticides; the highest residue level, measured in 1964, was 16.3 mg/kg. Sixty-three of the 286 specimens of plant origin contained organochlorine pesticides; the highest level was 2.26 mg/kg. While samples of animal origin contained no organophosphorus pesticide residues, some of the plant samples did; the highest residue level was 0.2508 mg/kg. Parallelism was found between the annual variations of the organochlorine pesticide residues levels found in samples of animal and vegetable origin. The residue levels dropped to trace amounts by 1973.

77-0986. Danieliants, L. A. (Inst. Sanit., Hyg. Occup. Dis., Tashkent, USSR). **Ozdorovlenie uslovii truda v proizvodstve ammofosa. [Improving the working conditions in ammophos production.]** *Gig. Tr. Prof. Zabol.* (11): 48; 50; 1976. (Russian)

The working conditions were analyzed at an ammophos (DAEP) production plant before and after the implementation of protective measures to improve the conditions. The ammophos dust concentration in the workplace atmosphere was in the range of 0.6-324 mg/m^3 before the improvements. Material handling processes were chiefly responsible for the dust emissions. Considerable abatement of the emissions and dust concentrations was achieved by the installation of exhaust systems and by the sealing of some of the equipment. The dust is separated by a combination of cyclones and wet scrubbers.

77-0987. Attri, B. S.; Lal, R. (Indian Agric. Res. Inst., New Delhi, India). **Residues and residual toxicity of ethyl and methyl parathion on cowpea.** *Indian J. Agric. Sci.* 44(7): 481-486; 1974. (14 references)

Residues and residual toxicity of ethyl and methyl parathion were determined on cowpea (*Vigna sinensis* (L). Saviex Hassk.) sprayed at 0.350 and 0.560 kg/ha on the early crop (June-July, average temperature 32.8°C). The insecticides were sprayed after removing all the marketable-size pods and the residues determined by bioassay as well as colorimetric method. Estimates by bioassay and colorimetric method showed a highly significant coefficient of correlation. The residues of ethyl parathion on cowpea pods of early crop, when sprayed at 0.350 and 0.560 kg/ha, reached the tolerance limit of 0.7 ppm (FAO/WHO, 1971) in 1.7 and 3.1 days and those of methyl parathion reached the tolerance limit of 1 ppm in 0.1 and 2.2 days, respectively, after the treatment. On leaves, the residues of both the insecticides with the lower and the higher dosage reached the tolerance levels, respectively, in 4 to 6 days and 6 to 9 days after treatment. On the late crop, the residues of ethyl parathion dissipated to the tolerance level 4.1 and 5.7 days and those of methyl parathion 1.5 and 2.7 days, respectively. On leaves, the residues of ethyl parathion took 10 to 11 days and those of methyl parathion 7 to 8 days against *Aphis craccivora* Koch with the lower dosage of either insecticide on either crop.

77-0988. Singh, J.; Deshmukh, S. N. (Punjab Agric. Univ., Ludhiana, Punjab, India). **Estimation and dissipation of DDT and endosulfan residues in and on the fruits of okra.** *Indian J. Agric. Sci.* 44(8): 516-520; 1974. (6 references)

An experiment was conducted in 1971 to determine the residues of DDT and endosulfan in and on the fruits of okra (*Abelmoschus esculentus* (L.) Moench). Four sprays of DDT and endosulfan individually at 0.875 and 0.250 kg ai/ha were given. Samples were taken 0, 1, 3, 5, 7, 10 and 15-days after spraying and analyzed by gas-liquid chromatography. In the *p,p'*-DDT, no residue was detected after 10 days and even the initial deposits were below the tolerance limit of 7 ppm. The initial deposits of endosulfan were below the tolerance limit of 2 ppm. No residue of endosulfan could be detected in the samples taken after 7 to 10 days. In the fruits of marketable size developed from sprayed flowers, no residue of endosulfan could be detected, whereas in the *p,p'*-DDT a residue of 0.08 ppm was found.

77-0989. Kathpal, T. S.; Dewan, R. S. (Dep. Soil Sci., Rajasthan Coll. Agric., Udaipur, India). **Endosulfan residues in/on sorghum under different agroclimatic conditions of India.** *Indian J. Agric. Sci.* 46(8): 354-358; 1976. (10 references)

In a two year trial conducted at Delhi, Hyderabad, Kanpur and Udaipur, India, the residues of endosulfan applied at 1.50 and 1.80 kg ai/ha reached below the tolerance level of 2 ppm in sorghum plants within 22 days after the last application. Endosulfan did not translocate into the grains at any of the locations and also did not leaves any toxic residues in/or sorghum grains at harvest.

77-0990. Singh, R.; Gupta, H. C. L.; Pareek, B. L. (Dep. Entomol., Coll. Agric., Univ. Udaipur, Rajasthan, India). **Estimation of carbaryl residues in/on sponge gourd.** *Indian J. Environ. Health* 18(3): 212-218; 1976. (9 references)

A calorimetric method was used to estimate residues of carbaryl in leaves and fruits of sponge gourd. Spray concentrations of produced 0.1% and 0.2% deposits of 168.54 and 433.27 ppm, respectively, that declined to undetectable amounts in 32 and 35 days. The deposits on fruits were 13.818 and 17.815 ppm, declining to well below the tolerance limit of 10 ppm in 3 and 7 days, respectively.

Washing of treated fruits for 2 minutes under tap water could reduce the residues well below the level considered safe for human consumption. Similarly the removal of bark decreases residues to well below the tolerance levels; and no penetration of carbaryl occurs.

77-0991. Nash, R. G.; Beall, M. L., Jr.; Harris, W. G. (Agric. Environ Qual. Inst., Agric. Res. Serv., U.S. Dep. Agric., Beltsville, MD 20705). **Toxaphene and 1,1,1-trichloro-2,2-bis(*p*-chlorophenyl) ethane (DDT) losses from cotton in an agroecosystem chamber.** *J. Agric. Food Chem.* 25(2): 336-341; 1977. (12 references)

Toxaphene at the rate of 200 to 267 mg/m^2 (2 to 2.7 kg/ha) and DDT at 100 to 133 mg/m^2 (1 to 1.3 kg/ha) were applied to cotton plants at weekly intervals for 6 weeks in an enclosed chamber (agroecosystem) and the residues monitored for 90 days. Twenty-four percent of the toxaphene and 15% of the DDTR (*p,p'*-DDD, *p,p'*-DDT, and *o,p'*-DDT) volatilized and 20 and 24%, respectively, was found in the surface 1-cm soil. Most of the insecticide residues volatilized within 24 h from 18.9, 7.3, and 0.4 mg/m^2 per day (189, 73, and 4 g/ha per day) on days 1, 3, and 56 for toxaphene and 6.5, 1.8, and 0.2 mg/m^2 per day (65, 18, and 2 g/ha per day) for DDTR. Volatilization losses were insignificant, < 0.1 mg/m^2 per day (< 1 g/ha per day), for both toxaphene and DDTR after 90 days. Volatilization losses for both insecticides seemed to follow log concentration with log time the first week and then log concentration with linear time thereafter. Calculated first-order equation half-lives for volatilization of toxaphene, *p,p'*DDT, *o,p'*-DDT, and *p,p'*-DDE were 15.1, 18.8, 14.3, and 15.1 days, respectively. On dry cotton leaves, toxaphene residues ranged from about 4000 to 700 ppm (100 to 18 mg/m^2) from application to 56 days, and DDTR residues ranged from about 2000 to 380 ppm (50 to 10 mg/m^2), respectively, for the same period. (Author abstract reprinted by permission of the American Chemical Society)

77-0992. Ambrosi, D.; Kearney, P. C.; Macchia, J. A. (Agric. Environ. Qual. Inst., Agric., Res. Serv., Beltsville, MD 20705). **Persistence and metabolism of phosalone in soil.** *J. Agric. Food Chem.* 25(2): 342-347; 1977. (12 references)

The organophosphate insecticide phosalone [*O,O*-diethyl *S*-(6-chloro-2-oxobenzoxazolin-3-yl) methyl phosphorodithioate] was incorporated in moist and flooded Matapeake loam and Monmouth fine sandy loam (1 kg of each soil) at 10 ppm plus 17.1 μCi of [*phenyl*-^{14}C] phosalone and sampled at 1, 3, 7, 14, 28, 56, and 84 days to determine thedistribution of ^{14}C in CO_2, volatile products, bound residues, and metabolites. Phosalone disappeared rapidly from both soils, and was accompanied by a large buildup of ^{14}C in the bound residue fraction. Loss by volatilization was insignificant while ring cleavage of thephenyl ring in the benzoxalone moiety to yield $^{14}CO_2$ accounted for less than 10% loss. Fractionation of the bound residues showed that the distribution of ^{14}C decreased in the following Matapeake loam where the distribution was fulvic acid < humic acid < humic, except for flooded Matapeake loam where the distribution was fulvic acid < humic < humic acid. The half-life of phosalone in soils was 3-7 days. Products detected in soil extracts included 6-chloro-2-benzoxazolinone and phosalone oxon. Products identified by mass spectral analysis were phosalone and 2-amino-7-chloro-3*H*-phenoxazin-3-one. The phenoxazinone is postulated to arise by condensation of 2 mol of 2-amino-5-chlorophenol. (Author abstract reprinted by permission of the American Chemical Society)

77-0993. Talekar, N. S.; Sun, L. T.; Lee, E. M.; Chen, J. S. (Asian Vegetable Res. Develop. Cent., Sanhua, Tainan 741, Taiwan). **Persistence of some insecticides in subtropical soil.** *J. Agric. Food Chem.* 25(2): 348-352; 1977. (12 references)

A long-term experiment was undertaken to investigate the persistence of selected insecticides following their repeated seasonal application to soil under subtropical conditions. Residues of DDT and dieldrin declined 20 and 25% in the fall and winter months, and there was no accumulation of residue with further application of these chemicals during spring and summer. Two organophosphates (fonofos and phorate) and one carbamate (carbofuran) degraded rapidly resulting in only 8, 0.4, and 32% recoveries, respectively, at the end of the fall and winter seasons. Their breakdown was further accelerated during the hot, rainy spring and summer months when their recoveries were lower. When grown in treated silt loam soil, sweet potatoes and white potatoes absorbed the residues of these chemicals and their metabolites at different levels. (Author abstract reprinted by permission of the American Chemical Society)

77-0994. Tafuri, F.; Businelli, M.; Scarponi, L.; Marucchini, C. (Cent. Stud. Chem. Antiparassitari, C. N. R., Ist. Chim. Agrar. Univ., 06100 Perugia, Italy). **Decline and movement of AG chlordane in soil and its residues in alfalfa.** *J. Agric. Food Chem.* 25(2): 353-356; 1977. (16 references)

Analytical methods for the determination of α-, γ-, oxy-, and photo-*cis*-chlordane are described. Experimental plots were treated prior to planting with AG chlordane 10% granules at dose rates of 3 and 6 kg of AI/ha. Alfalfa was sown within 1 h from when AG chlordane had been incorporated into the soil to a depth of 10 cm. A high proportion of the γ-chlordane originally applied persisted in the soil at the time of the second cutting, 169 days after application, thereby showing that γ-chlordane is more stable than the α-isomer. Insecticide movement through the soil was considerable. The difference between the quantities of α- and γ-chlordane recovered in the analysis from

washed and unwashed alfalfa would seem to suggest that an appreciable part is present on the plant surface, possibly in consequence of contamination by particles of treated soil. However, surface contamination is considerably less than the quantity which penetrates into the plant tissues, although the total amount recovered from washed plants is relatively small. Photo-*cis*-chlordane residues in alfalfa were always below the sensitivity limig (0.001 ppm), while oxychlordane, found only in the second cutting, gave values of 0.001 and 0.002 ppm at dose levels of 3 and 6 kg of AI/ha. (Author abstract reprinted by permission of the American Chemical Society)

77-0995. Marshall, W. D. (Chem. Biol. Res. Inst., Agric. Canada, Ottawa, Ontario, Canada K1A 0C6). **Thermal decomposition of ethylenebisdithiocarbamate fungicides to ethylenethiourea in aqueous media.** *J. Agric. Food Chem.* 25(2): 357-361; 1977. (25 references)

The kinetics of thermal decomposition of nabam in aqueous media was investigated. The rate of conversion of the dithiocarbamate to ethylenethourea (ETU) was influenced by temperature, available oxygen, and the pH of the system. Ethylenethiuram monosulfide and β-aminoethyldithiocarbamate but not ethylene diisothiocyanate were confirmed as intermediates in the conversion of nabam to ETU at elevated temperature. A degradation scheme consistent with the decomposition kinetics is proposed. Parameters which control the conversion of ethylenebisdithiocarbamate fungicides to ETU are discussed. (Author abstract reprinted by permission of the American Chemical Society)

77-0996. Cavell, B. D.; Pollard, S. J.; Wells, C. H. J. (ICI Ltd., Plant Protect. Div., Jealott's Hill, Berkshire RG12 6EY, England). **Kinetic and energetic aspects of the photodimerisation of some systemic pyrimidine fungicides.** *J. Chem. Soc. Perkin Transact. II Phys. Organ. Chem.* 216-221; 1977.

The photodimerization of 2-dimethylamino-4-hydroxy-6- methyl-5-*n*-butyl- (1), 2-ethylamino- 4-hydroxy-6- methyl-5-*n*-butyl- (2), and 4-hydroxy-5,6-dimethyl- 2-dimethylamino-pyrimidine (3) has been investigated in acetonitrile. Quenching experiments have shown that the formation of photodimers involves a triplet state of (1)-(3), the energies of which have been estimated. The quantum yields for intersystem crossing from the singlet to triplet manifolds of (1)-(3) fall in the range 0.09-0.11, and the quantum yields for photodimerization fall in the range 0.07-0.08. Rate constants for radiationless decay of the triplet state pyrimidines have been determined (2.1-3.0 x 10^5), and also the rate constants for reaction of the triplet states of (1)-(3) with the corresponding ground state pyrimidine (1.5-2.0 x 10^3 l/mol/s). The efficiency of the triplet state dimerisation reactions of (1)-(3) is high compared with that of the analogous triplet state reactions of the biologically important pyrimidines, thymine and uracil.

77-0997. Staiff, D. C.; Butler, L. C.; Davis, J. E. (Field Stud. Sect., Special Pollut. Branch, Popul. Stud. Res. Div., Health Eff. Res. Lab., Environ. Prot. Agency, Wenatchee, WA). **Field disposal of DDT: effectiveness of acidified powdered zinc on reduction of DDT in soil.** *J. Environ. Sci. Health* B12(1): 1-13; 1977. (13 references)

In order to investigate methods suitable for field disposal of small quantities of excess DDT on farms and orchards, the degradation of DDT burried with various concentrations of powdered zinc and a mild acid was followed. Powdered zinc mixed with DDT, acetone, and acetic acid led to the formation of DDD and DDMS, which are environmentally less objectionable than DDT or DDE.

77-0998. Sheela, S.; Vasantharajan, V. N. (Indian Inst. Sci., Bangalore, India). **Persistence of fensulfothion in soil.** *J. Environ. Sci. Health* B12(1): 15-35; 1977. (13 references)

Persistence of fensulfothion (*O,O*-diethyl-*O*-(*p*-methyl sulfinyl) phenyl phosphorothioate) in soil under laboratory conditions was followed using three day old larvae of the silkworm, *Bombyx mori* L., and also by the cholinesterase inhibition method. Low concentrations, i.e., 50-175 ppm persisted for about 50-60 days whereas high concentrations (250-500 ppm) remained even beyond 900 days in soil. Run-off water and soil from fields treated with fensulfothion were found to contain high concentrations of factors capable of inhibiting cholinesterase. Paper and thin layer chromatographic analysis showed that fensulfothion and its oxygen analogues were the predominant compounds present in the samples. It is stressed that fensulfothion is among the more persistent organophosphorus pesticides.

77-0999. Burdon, J.; Hayes, M. H. B.; Pick, M. E. (Chem. Dep. Univ. Birmingham, Birmingham, England). **The electron density distribution in pyridinium and bipyridylium compounds and its relevance to their absorption by expanding lattice clays.** *J. Environ. Sci. Health* B12(1): 37-51; 1977. (17 references)

Charge distributions in 1,1′-ethylene-2,2′-bipyridylium (diquat), 1,1′-dimethyl-4,4′-bipyridylium (paraquat) and 1-methylpyridinium organocations were calculated by a Complete Neglect of Differential Overlap semi-empirical quantum mechanical procedure. The data show that the positive charges in the organocations are distributed around the molecules and are greatest in the positions *ortho* and *para* to the heterocyclic nitrogen atoms. Earlier interpretations of the mechanisms of adsorption of paraquat and diquat by soils and clays assumed that the charges were located in the heterocyclic nitrogen atoms. Here some consideration is given to the influence of the charge delocalizations on the processes of adsorption by montmorillonite and vermiculite clay preparations.

77-1000. Kniazev, A. F.; Kozlov, Iu. S.; Rozvage, R. I.; Kurchatov, G. V. (State Technol. Sci. Res. Inst. Maint. Oper. Farm Mach. Tractors, USSR). **Detoksikatsiia lindana moiushchim sredstvom "Kompleks". [Degradation of lindane in "Complex" detergent.]** *Khim. Sel. Khoz.* 14(7): 63-64; 1976. (3 references) (Russian)

The degradation and detoxification of lindane by the detergent solution "complex", used to clean soiled and contaminated farm equipment, was studied. "Complex" consists (in wt. %) of sodium perborate (3), soda ash (13), sodium salts of synthetic fatty acids (5), triethanolamine (5), Syntanol DS-10 or Syntamide-5 (2), disodium salts of monoalkylsulfosuccinic acid (5), and water (67). A high rate of dechlorination by 10% aqueous solution of "complex" was observed at 80°C. Two chlorine atoms were split off the lindane molecule, and low-toxicity chlorocyclohexenes were formed.

77-1001. Gvozdikova, L. G.; Solov'eva, E. E.; Berliant, O. R.; Kabanova, N. N. (Ukrainian Sci. Res. Inst. Canning Industry, USSR). **Vliianie tekhnologii konservivovaniia na soderzhanie pestitsida antio v ovoshchakh. [Effect of food preservation processes on formothion residues in vegetables.]** *Konserv. Ovoshchesush. Promyshl.* 7: 32-33; 1976. (Russian)

The effect of different preservation processes on the formothion residues in cucumbers, tomatoes, and vegetable marrow were studied. Washing with water at 20 and 40°C, with 0.5% aqueous sodium hydroxide solution, with 0.1% aqueous solution of hydrochloric acid and with 1% aqueous solution of acetic acid, as well as blanching in water at 60°C for 3 minutes, packing with salt-vinegar brine at 8°C, and sterilization caused considerable reduction of the residue levels. The reduction was greatest after high-temperature treatment (sterilization and packing with brine), reaching 92-100%.

77-1002. Anpalov, V. A.; Mostovoi, M. I. (Siberian Sci. Res. Inst. Forestry, USSR). **Ostatki aminnoi soli 2,4-D v rastvishnom korme. [Residues of 2,4-D amine salt in mixed feed.]** *Khim. Sel. Khoz.* 14(11): 36-38; 1976. (10 references) (Russian)

The effect of weather conditions and fertilization on the residue dynamics of 2,4-D amine salt in grassland plants in a forest steppe was studied. The herbicide was applied in mid-June in three consecutive years at a rate of 1.2 kg/ha in 500 l solution per ha. The residue levels in grass were fairly high with 3-5.25 mg/kg during the first 35 days in dry weather. In wet weather, the residue levels were considerably lower (0.8-2.0 mg/kg), and many samples were residues-free after 30-35 days. Nitrogen fertilizer caused a considerable reduction of the residue levels probably due to the intensification of the physiological processes in the plants. The findings indicate that grass from treated parcels should not be used as feed before 40 days in dry weather or without irrigation before harvesting.

77-1003. Adeishvili, L. G.; Klisenko, M. A.; Pis'mennaia, M. V. (Georgian SSR Sci. Res. Inst. Plant Protect., USSR). **Dinamika umen'sheniia ostatkov pestitsidov v poldakh. [Dynamics of pesticide residues in fruits.]** *Khim. Sel. Khoz.* 14(11): 43-44; 1976. (8 references) (Russian)

The residue dynamics of phosalone, phthalophos (phosmet), rogor (dimethoate), anthio (formothion), carbophos (malathion) and gardona (tetrachlorvinphos) was studied in apples, tangerines and grapes after they were sprayed with 0.2% emulsions of these preparations. The residue half-life periods decreased in the order phosalone, phosphamide, gardona, phthalophos, carbophos and anthio, which largely corresponded to the rates of acid hydrolysis of these pesticides. The rate of degradation was lower in the flesh than in the skin for phosalone and phthalophos, while the degradation of rate of anthio, phosphamide, and partly also of carbophos was higher in the flesh than in the skin.

77-1004. Ielmini, M.; Pallotti, G.; Bencivenga, B.; Veglinate, A. (Lab. Prov. Ig. Profil., Reparto Chim. Ric.). **Contaminazione de mercurio nel pesce e in altri prodotti alimentari della pesca: indagine nella provincia de Roma. [Mercurial contamination in fish and other nutritive products: investigation in the Province of Rome.]** *Rass. Chim.* 27(2): 71-84; 1976. (37 references) (Italian)

Data on the toxicology and environmental burdens of mercury are reviewed. Mercury was assessed in 428 samples of fresh fish and 210 canned tuna samples. The results are discussed with respect to Italian environmental law.

77-1005. Hernandez, L. M.; Gonzalez, M. J.; Baluja, G. (Inst. Quim. Organ. Gen., Madrid, Spain). **Contaminacion del medio por plaguicidas. IX. Residuos de insecticidas clorados, difenilos policlorados y mercurio en sustratos bioticos y abioticos del rio Guadalquivir. [Environmental contamination by organochlorine pesticides. IX. Chlorinated insecticides, polychlorinated biphenyls (PCB's) and mercury residues in the biotic and abiotic substrata of the Guadalquivir river (Spain).]** *Rev. Agroquim. Technol. Aliment.* 16(2): 279-291; 1976. (11 references) (Spanish)

Organochlorine and mercury contamination were studied in the field by analysis of abiotic substratum and first links of trophic chains of an ecosystem in the area of a river. Very low residue levels were generally found in all samples, although DDT derivatives and PCBs were found at higher levels in some species. Residue concentrations differed in different trophic levels. In the interval between 1973 and 1975 the organochlorine residue levels increased by a factor of 1.4.

77-1006. Albert, L.; Saval, S. (Cent. de Invest. Estudios Avanzados, Inst. Politec. Nac., Depto. Quimica, Mexico City, Mexico). **Residuos de plaguicidas organoclorados**

en carne de pollo y en huevo. [Organochlorine pesticide residues in chicken meat and eggs.] *Rev. Soc. Quim. Mex.* 20(3): 126; May-June 1976. (Spanish)

Studies have shown that, in Mexico, organochlorine pesticides residues most frequently found in chickens meat and eggs are *p,p'*-DDT and its metabolites, lindane and its isomers, aldrin, dieldrin, and endrin. Occasionally, heptachlor, heptachlor epoxide, and telodrin residues are found.

77-1007. Leone, A. M.; Lamparelli, F.; La Notte, E.; La Notte, F. (Ist. Ind. Agrar. Dell'Univ., Bari, Italy). **Sui residui di alcuni insetticidi fosfororganici nell'olio di oliva in relazione alle techniche di lotta antidacica. Nota II: Risultati nel trattamento parziale delle chiome. [Research on some phosphororganic insecticide residues in olive oil in relation to techniques of Dacus oleae control. II: Results of partial treatment to the foliage.]** *Riv. Ital. Sostanze Grasse* 53(12): 381-389; 1976. (1 reference) (Italian)

Phosphororganic insecticide residues in olive oil following usage of activated protein baits against *Dacus oleae* varied according to the chemical characteristics and dose of the insecticide, the number of treatments and the time lapse between last treatment and harvest. Diverse cultivars may affect differently the degradation of the active matter. The lowest values of residues (down to trace level) were observed in oils from olives treated with dimethoate baits. Conversely, fenthion residue even in the most favourable instance swere never lower than 0.2 ppm.

77-1008. Cabridenc, R. (Inst. Nat. Rech. Chim. Appl., Paris, France). **Les derives organochlores et notamment les pesticides peuvent-ils etre presents dans les eaux distribuees. [Are organochlorine compounds and especially pesticides present in drinking water?]** *Tech. Sci. Munic. Eau* 10: 415-424; 1976. (28 references) (French)

Organochlorine compounds used as pesticides, insecticides, fungicides, bactericides, and herbicides may fail to be removed during the treatment of waste waters and raw water. The main water bodies in the United States contain organochlorine pesticides at concentrations of 0.2 to 500 ng/l. In 1974, an EPA study of the drinking water in New Orleans revealed 66 organic derivatives, many of which were organochlorines, in large concentrations: 0.05 μg/l dieldrin, 0.004 μg/l endrin. The main European waterways contain small amounts of organochlorines. Lindane, dieldrin, and DE were found in the Escaut in Belgium, and lindane, DDT, and heptachlor were detected in concentrations of about 0.1 μg/l in the Rhine and the Danube. Most organochlorines can accumulate in lipids when ingested. Long term toxic effects consist of nervous, hepatic, and renal disorders. Experimentally, DDT has altered the metabolism of amino acids, causing histologic hepatic anomalies. Although it appears that drinking waters in France are fairly free of organochlorine compounds, there are potential future risks. More data are needed on actual organochlorine concentrations, limits and quality standards have to be set, and chlorination has to be controlled.

77-1009. Stijve, T.; Kalsbach, R.; Eyring, G. (Nestle Prod. Tech. Assist. Co., Ltd., Frankfurt am Main, West Germany). **Determination and occurrence of ethylene chlorohydrin residues in foodstuffs fumigated with ethylene oxide.** *Trav. Chim. Aliment. Hyg.* 67(49): 403-328; 1976. (21 references)

A simple method for the routine analysis of ethylene chlorohydrin (ECH) residues is described which is also suitable for the simultaneous determination of ethylene bromohydrin (EBH), a residue formed similarly to ECH by reaction of ethylene oxide (EO) with inorganic bromide, introduced by previous treatment with methyl bromide. ECH and EBH are isolated by cold extraction with a mixture of acetonitrile-water and determined by GLC using FID. Confirmatory analysis is performed on a steam distillate that is obtained by using a specially designed semi-micro apparatus. Upon treatment with ammonia both halohydrins are converted to ethanolamine and to the corresponding halogen anion which are chromatographed in two TLC systems. The limit of detection is 1-10 ppm halohydrin by GLC and 10-20 ppm by TLC. ECH was found in 116 out of 250 samples of raw materials. EBH residues were never detected.

77-1010. Suzuki, M.; Yamato, Y.; Akiyama, T. (Kitakyushu Munic. Inst. Environ. Health Sci., Kitakyushu, Japan). **Occurrence and determination of a herbicide benthiocarb in rivers and agricultural drainages.** *Water Res.* 11(3): 275-279; 1977. (8 references)

The occurrence and determination of a herbicide, benthiocarb, 4-chlorobenzyl *N,N*-diethyl- thiolcarbamate (Saturn) in rivers and agricultural drainages was investigated. Benthiocarb residues were detected in water samples when it has been applied to rice paddies, after rice seedling transplantation, in concentrations of between 10.00 and 0.11 μg/l. These residues entered into rivers and agricultural drainages as a result of overflows from rice paddies. However, benthiocarb residues could not be found in water samples after the termination of its application to rice paddies, suggesting that the applied benthiocarb might be degraded by microbial and physicochemical actions such as photochemical reactions occurring on the soil surface. Benthiocarb residue levels were higher in longer rivers than in agricultural drainage. The contribution of rainfall to the benthiocarb concentrations was shown. Benthiocarb in water was extracted with *n*-hexane and identified by gas chromatography using a flame photometric detector (sulphur filter 394 nm) and a combined gas chromatography-mass spectrometry-computer system. The minimum detectable amount of benthiocarb in water sample by gas chromatography was 0.56 ng and about 100 ng of benthiocarb could be identified by a gas chromatography-mass spectrometry-computer system.

77-1011. Eichner, M. (Chem. Landesuntersuchungsanst., Offenburg, West Germany). **Ueber Rueckstandsbestimmungen von chlorierten Insecticiden und polychlorierten Biphenylen in Fischen des Bodensees, des Oberrheins und dessen Zufluessen sowie in diesen Gewaessern. [Residue analysis of chlorinated pesticides and polychlorinated biphenyls (PCB) in fish and waters.]** *Z. Lebensm. Unters-Forsch.* 161(4): 327-336; 1976. (20 references) (German)

Chlorinated insecticides and PCB have been regularly found in Lake Constance and the Rhine river as well as in dredger-lakes and fishing waters. DDT has lost the importance of earlier years, whereas HCB and PCB are found in increasing quantities. Almost all water bodies are contaminated today.

77-1012. Bartl, P.; Parlar, H.; Korte, F. (Inst. Chem. Tech. Univ. Muenchen, West Germany). **Beitraege zur oekologischen Chemie, CXIII. Photoinduzierte Desaminierungsreaktion an 4-amino- 3-methylthio- 1.2.4-triazin- 5(4H)-onen. [Contributions to ecological chemistry part 113. Photoinduced deamination reaction of 4-amino-3-methylthio- 1,2,4-triazin- 5(4H)-ones.]** *Z. Naturforsch. Teil B* 31(8): 1122-1126; 1976. (12 references) (German)

The deamination reaction of a series of 4-amino-3-methylthio- 1,2,4-triazin- 5(4H)-ones (1 a-e) was found to be dependent on the presence of oxygen and the nature of the solvent. Experiments with a series of 6-*tert*-butyl-3-methylthio- 1,2,4-triazin- 5(4H)-ones (3 a-e) indicate that the formation of 6-*tert*-butyl- 3-methylthio- 1,2,4-triazin-5-one (2d) occurs only in the case of an N-N-bond, but is completely independent of the substituent on the nitrogen atom which is split off.

77-1013. Eckerskorn, W. (Bundesminist. Ernaehr., Landwirtsch. Forsten, Bonn, West Germany). **Ueber Kontaminationen von Futtermitteln und entsprechende Regelungen aus ernaehrungspolitischer Sicht. [On the contamination of fodder and corresponding alimentary policy regulations.]** *Zentralbl. Bakteriol. Parasitenk. Infektionskr. Hyg. Abt. I. Orig. Reihe B* 163(1-4): (41 references) (German)

Animal feed is subject to contamination by microorganisms and their metabolic products, boicides, environmental chemicals and undesirable substances which occur naturally in animal feed. Damage resulting from such contaminations can impair the animal production. Deteriorated growth and performance of diseases may result. The food product itself may be contaminated. The Animal Feed Act, the Plant Protection Act as well as the Fertilizer Act form a combination of legal protection aimed at guaranteeing the consumers' need for agricultural products of high quality and of an adequate standard of health throughout the entire production cycle. Paragraph 12 of the Animal Feed Act of 1926 deals with substances used as fodder, which may injure the health of animals; paragraph 24 of the Animal Feed Act of 1949, in a voluminous catalogue of "prohibited animal fodder", lists those containing "toxic components". The Milk Act prohibited, as early as 1931, the distribution of milk that might have been contaminated by feeding of unsuitable fodder to the animals. Finally the Animal Epidemic Act regulates the use of animal-derived fodder on the basis of possible contamination with the pathogens of animal epidemic diseases. The pertinent regulations prescribe for animal feed maximum quantities of toxicologically relevant substances such as aflatoxin B_1 and the 7 most important chlorinated hydrocarbons. A plant protective regulation introduces extensive prohibitions of applications and restrictions of plant-protectives. The Fertilizer Act also contains appropriate provisions. A supranational guideline of the Council of Ministers which entered into force at the end of 1973 within the European Community restablishes the maximum content of undesirable substances and products in animal feed to ensure uniform legislation among the EC members in this area.

See also **77-0970** **77-1089**

77-1014. Madjidi, M. (Dep. Anesthesiol., Fac. Med., Razi, Univ de Teheran, Teheran, Iran). **Reanimation des intoxiques par les agents neurotoxiques organo-phosphores.** [**Resuscitation following intoxication with neurotoxic organophosphorus substances.**] *Acta Med. Iran.* 18(1-2): 21-26; 1975. (4 references) (French)

In case of organophosphorus intoxication, atropine should be immediately administered in high doses: 2 mg every 10 minutes until signs of atropinization appear. Atropine decreases the intensity of bronchospams which make respiratory resusciation difficult. It has no effect on respiratory problems and does not prevent the fixation of the toxin. Convulsions are treated with anticonvulsants and possibly barbiturates. Specific anticholinesterase antidotes most frequently used are contrathion, administered iv by slow perfusion, and TMB4. These antidotes are effective only when used shortly after intoxication. Immediate dangers are usually averted after 24 hours. Use of transquilizers or relaxants should be avoided during a treatment and in weeks after recovery.

77-1015. Plestina, R.; Piukovic-Plestina, M. (Inst. Med. Istraz. Med. Zagreb, Yugoslavia). **Ucinak pesticida no oko i vid.** [**Effect of pesticides on eye and vision.**] *Arh. Hig. Rada Toksikol.* 27(4): 321-333; 1976. (67 references) (Serbo-Croatian)

Present knowledge on the effect of pesticides on eye and vision in humans and experiments animals is reviewed. While the knowledge about the acute specific biological effects of different pesticides is wide, possible delayed effects caused by prolonged exposure have received little attention. Recently, a number of Japanese authors have published retrospective studies on the effect of pesticides on eye and vision in exposed humans. Obvious visual impairment found in selected populations indicated the existence of a special nosologic entity, which has become known as Saku Disease. Information from 21 papers dealing with the exposed humans is summarized. The number of examined subjects, their occupations, type and duration of exposure are plotted against ophthalmological findings. Acute exposure was seldom assessed. The most striking finding was the constriction of peripheral visual fields. In most cases the methodology and conditions of the examination were insuficiently described. Some clinical observations on the effects of anticholinesterase miotics used in therapy for glaucoma are also described. The experiments carried out in dogs, rats and rabbits were generally designed to study the possible effect of a given compound, but only seldom to study the mechanism through which the eye impairment is generated. The morphological findings or electrophysiological changes were rather nonspecific. Limited efforts to explain these findings have not been very successful.

77-1016. Grobe, J. W. (Grabenstrasse 16, 5500 Trier, Germany). **Periphere Durchblutungsstoerungen und Akrocyanose bei arsengeschaedigten Moselwinzern.** [**Peripheral circulation disorders and acrocyanosis in arsenic-injured viticulturists.**] *Berufs-Dermatosen* 24(3): 78-84; 1976. (10 references) (German)

Arsenic injury to 100 Moselle vine dressers examined from 1972-1975 is reported. The patients were barn between 1890 and 1923, and had an average occupational exposure of twenty years. Typical arsenic melanisms were found at the hairline, on the nape of the neck, on the shoulders, chest, arms, and on the back of the hands, which pass into precanceroses and carcinomas. The average latency time until the first injuries occur is 26 years. However, there have been latency periods of up to 50 years, depending mainly on the total amount of arsenic absorbed. There are skin alterations which resemble an acrodermatitis chronica atrophicans Herxheimer. Histological exmainations showed the symptoms of an endangitis obliterans with atrophy of the cutis. These symptoms were found in 60-70% of the 50-60 year-old patients, in 80-90% of the 60-70 year-old patients, and in 90-95% of the 70-80 year-old patients. Distinct peripheric circulatory disturbances, cyanosis of the lips, dyspnea, and emphysema together with typical cardiac insufficiency were found. Foot and finger pulse were distinctly slower, and the temperature of the skin remarkably lower. The cyanosis gets worse with age. These symptoms appeared in only 1-2% of a control group.

77-1017. Popendorf, W. J. (Univ. Calfornia, Berkeley, CA). **An industrial hygiene investigation into the occupational hazards of parathion residues in citrus harvesters.** *Diss. Abstr. Int. B* 37(9): 4408; 1977.

A new foliar residue sampling method was developed employing a vacuum device to collect the "available" residue. This method was compared with the earlier "dislodgeable" residue method employing a leaf punch and water wash. The available residues were a superior index of the aerosol hazard based on their greater degree of correlation with worker-generated dust aerosols than was observed with the dislodgeable residues. Paraoxon frequently formed in these foliar residues and after seven days, it generally constituted the predominant hazard. The residue degradation pattern observed during these studies was characterized by the rapid decay of 90-98% of the initial parathion within 2-7 days post-application; some 1-8% of this parathion was converted to paraoxon during this interval. During the subsequent phase of degradation, the remaining parathion and paraoxon decayed at an equal rate with "half-lives" of 4-9 days. Whole-body dermal doses accounted for 89-96% of the workers' occupational exposures. Statistically, these estimated exposures accounted for 72% of the total variability in their individual AChE inhibitions, while dermal paraoxon alone accounted for 67% of this variability. Similarly, AChE inhibitions in several workers provided with respiratory protection while in the field were not detectably different from those without such protection. (Author abstract by permission, abridged. Copies of the thesis are available from University Microfilms, order No. 77-4575).

77-1018. Pimentel, J. C.; Menezes, A. P. (Dep. Pathol., Sanatorio D. Carlos I, Lisbon, Portugal). **Liver disease in vineyard sprayers.** *Gastroenterology* 72(2): 275-283; 1977. (33 references)

Liver disease with inclusions of copper was recognized among 30 rural workers with "vineyard sprayer's lung". The pathological findings were varied: focal or diffuse swelling and proliferation of Kupffer cells; histiocytic and sarcoid-like granulomata; fibrosis of variable degree in the perisinusoidal, portal, and subcapsular areas, accompanied by atypical proliferation of the sinusoidal lining cells; micronodular cirrhosis; angiosarcoma of the liver; idiopathic portal hypertension. Abundant deposits of copper were revealed by histochemical techniques within hepatic and pulmonary lesions in these patients. The observations on the human and experimental material suggest an etiological relationship between exposure to copper sulfate and the lesions described. A morphological resemblance was noted between the "liver disease of vineyard sprayers" and the hepatic lesions reported in workers exposed to inorganic arsenic and to vinyl chloride. The identification of the inhaled foreign material within the liver lesions raises important etiological considerations.

77-1019. Popov, T. A.; Vrochinsky, K. K. **Materialy k obosnovaniyu PDK DNOK v vode vodoemov. [Substantiation of the maximal permissible concentrations of DNOC in water bodies.]** *Gig. Sanit.* 41(6): 12-15; 1976. (5 references) (Russian)

The threshold odor value of DNOC in water was 0.93, and the practical threshold 2.64 mg/l. The threshold value of a bitter astringent taste was determined at 0.08 with a practical level of 0.21 mg/l. The threshold concentration changing the color of water (the height of a column of 20 cm) was 0.04 mg/l. The threshold concentration affecting the sanitary regimen of a water body was 0.4 and the subthreshold 0.04 mg/l. In a chronic toxicologic experiment, threshold doses of 0.025 mg/kg and subthreshold doses of 0.0025 mg/kg were measured. A maximum permissible concentration of 0.05 mg/l is suggested.

77-1020. Ubaidullaev, R. U.; Madzhidov, U. A. (Uzb. Nauchno-Issled. Inst. Sanit., Gig. Profzabol., Tashkent, USSR). **Gigienicheskaya kharakteristika fosfamida kak zagryaznitelya atmosfernogo vozdukha. [Hygienic characteristics of phosphamide as an atmospheric pollutant.]** *Gig. Sanit.* (9): 7-9; 1976. (5 references) (Russian)

The maximum permissible single exposure and daily average exposure to atmospheric phosphamide (dimethoate) were calculated from human and animal exposure experiments. The odor threshold value and the effect on reflexes and brain electrical activity were determined from human volunteers. The resorption of phosphamide was studied in aniamls exposed by inhalation for 24 hours.

77-1021. Akhundov, V. Iu.; Akhundov, K. F.; Mamedova, A. P. (G. M. Musabekov Azerbaijan Sci. Res. Inst. Virol., Microbiol. Hyg., Baku, USSR). **K obosnovaniiu predel'no dopustimoi kontsentratsii abata v vode vodoemov. [Data on abate tolerance in reservoir water.]** *Gig. Sanit.* (10): 101-103; 1976. (Russian)

Experiments and investigations carried out to substantiate the maximum permissible abate (temephos) concentration in water bodies are described. The organoleptic threshold concentration was found to be 42 mg/l, while the threshold concerning transparency and color was 5.1 mg/l. Abate is persistent in water. At a concentration of 6.06 mg/l (88% active agent) the biochemical oxygen demand is slightly increased. The dose of 0.055 mg/kg, corresponding to 1.1 mg/l in water, was ineffective in chronic oral poisoning tests in rabbits. The maximum allowable concentration of abate in water bodies is recommended to be set at 1 mg/l.

77-1022. Sinclair, S. (Dep. Pediat., All-India Inst. Med. Sci., New Delhi, India 110016). **Childhood poisoning.** *Indian Pediatr.* 12(12): 1257-1259; 1975. (7 references)

From July 1967 to July 1972 a total of 36 children were admitted to the All-India Institute of Medical Sciences, New Delhi, with poisoning, 29 being due to accidental ingestion, and 7 to adverse reaction to drug therapy. The commonest agent responsible was kerosene oil which was the cause of 10 of the 29 cases of accidental poisoning or 34.5 per cent. Pesticides and medications were each responsible for 7 cases or 24.2 per cent each of the accidental poisoning cases. Poisoning occurred predominantly in the age group between I and 3 years, and in males. More cases occurred in summer. The only death was due to an adverse reaction poisoning cases. Predisposing factors were lack of adult supervision of the child, carelessness in storing medicines and potential poisons, insufficient knowledge regarding the danger from the use of insecticides, mental retardation in the child, and drug treatment advised by the lay public.

77-1023. Nicholson, S. S.; Cooper, G. W. (9940 N. Parkview Dr., Baton Rouge, LA 70815). **Apparent endosulfan toxicosis in calves.** *J. Am. Vet. Med. Assoc.* 170(3): 319; 1977. (1 reference)

Five 4-11-mo-old crossbred calves were dusted liberally with a 4% formulation of endosulfan to remove lice. Within less than 24 hr, one animal was dead and the remaining four were exhibiting muscle tremors, twitching of the ears, snapping of the eyelids, and/or violent body jerks. The animals were also exhibiting violent convulsive activity. Two other calves died and laboratory analysis of the tissues of one revealed 0.73, 3.78, and 0.10 ppm endosulfan in the brain, liver, and rumen contents, respectively. Gross lesions were not seen. When another animal was sprayed with a water hose, it became hyperexcitable and developed twitching of the ears, blepharospasm, muscle tremors, violent clonic-tonic convulsions, and ataxia.

The symptoms disappeared after spraying was discontinued, but the animal died later in the day. The remaining calf, a 60-kg, 4-mo-old female Hereford, recovered without complications.

77-1024. Quinlivan, S. C.; Ghassemi, M. (TRW Syst. Energy, Redondo Beach, CA). **Sources, characteristics, and treatment and disposal of industrial wastes containing hexachlorobenzene.** *J. Hazardous Mater.* 1(4): 343-359; 1977. (14 references)

A study conducted to identify the sources and characteristics of industrial wastes containing hexachlorobenzene and to review the methods currently used for treatment and disposal of HCB wastes. The chlorinated solvents and pesticide industries were found to account for nearly all HCB wastes produced (4,305 tons per year) by 14 industries reviewed as sources. Waste storage methods which are used prior to ultimate disposal include storage of solid waste cubes under plastic cover and use of water-covered lagoons. Methods for transportation of HCB wastes include use of forkift, truck, pipeline, heated tank trucks and rail. Ultimate waste disposal methods include land disposal, incineration (with or without by-product recovery), resource recovery, discharge to municipal sewage treatment plants, and emission to the atmosphere. Most HCB waste handled by industrial facilities is currently disposed of in two industrial landfills using a soil cover of 4 to 6 ft. with a polyethylene film placed at approximately mid-depth. Incineration at a sufficiently elevated temperature can effectively destroy HCB; HCl can be recovered as a by-product. Very limited actual cost data are available on existing facilities handling HCB wastes.

77-1025. Rosengart, R. M. (Dep. Pediatr., Southern California Permanente Med. Group, Los Angeles, CA 90027). **Poisoning with organophosphate insecticides.** *J. Pediatr.* 90(3): 500-501; 1977. (3 references)

The organophosphate insecticides represent a group of agents that cause coma associated with miosis in children. These pesticides act primarily by inhibiting cholinesterase, which causes an accumulation of acetylcholine with excessive stimulation of the parasympathetic system, central nervous system effects, and effects at the myoneural junction. The patient will exhibit weakness, abdominal cramps, perspiration, salivation, excessive respiratory tract secretions, pupillary constriction, and, in severe cases, respiratory arrest, convulsions, and coma. These agents are widely used in rural farming areas and urban areas and are absorbed orally, by inhalation and percutaneously. High doses of atropine (0.05 mg/kg) given every 20-30 min are necessary to reverse cholinergic effects. Pralidoxime (100 mg/kg) will reverse the central nervous system and muscular effects of the organophosphates. Recognition of this type of poisoning will allow prompt treatment with increased likelihood of reversal of symptoms.

77-1026. Naishtein, S. Ya. (A. N. Marzeev Kiev Sci. Res. Inst. Gen. Commun. Hygiene, Kiev, USSR). **Predel'no dopustimye ostatochnye kolichestva khlorofosa i karbofosa v pochve. [Trichlorfon and malathion tolerances in soil.]** *Khim. Sel. Khoz.* 14(12): 32-34; 1976. (5 references) (Russian)

Experiments carried out to substantiate trichlorfon and malathion tolerance in soil are presented. Both preparations were degraded more rapidly in alkaline medium than in acid one. Malathion, applied in a high dose of 40 mg/kg, penetrated only to a maximal depth of 20 cm. Trichlorfon, applied in a high dose of 60 kg/ha, penetrated to 60 cm. When used in the normal dose of 6 kg/ha, no traces of trichlorfon were found in potato tubers, while the malathion residue was 0.4 mg/kg in potato tubers in soil treated with the normal dose of 4 kg/ha. In a 2 mg/kg concentration in soil, trichlorfon is degraded in 60 days in acid soil, and in 15 days in alkaline soil, and no trichlorfon is released from the soil into the air and plants. The residue level in water leaching such soil was 0.05 mg/l. At a soil concentration of 2 mg/kg, malathion is degraded in 70 days in acid soil, and in 30 days in alkaline soil. Such soil releases a small quantity of malathion into the air; a concentration of 9 $\mu g/m^3$ was measured. Plants grown in such soil contained 0.3 mg/kg of malathion. Water leaching such soil had a residue level of 0.05 mg/l. The findings indicate that the tolerance for trichlorfon and malathion in soil should be set at 2 mg/kg.

77-1027. Hay, A. (Author address not given). **Dioxin damage.** *Nature* 266(5597): 7-8; 1977.

At least two of the approximately 100 pregnant (first trimester) women who were exposed to dioxin last year in Seveso, Italy have since given birth to children with malformations. The first abnormality was a slight intestinal obstruction and the second was a slight genital deformation. Both infants underwent successful surgery shortly after birth. It is not yet possible to link the deformations with the dioxin contamination. About 340 school children in Seveso have developed chloracne, largely as a result of contact with dioxin-contaminated school buildings. Six schools in the area have been closed until dioxin decontamination has been completed. The decontamination procedure will involve incineration of vegetation, dead animals, and polluted topsoil, which is to be removed to a depth of 25-35 cm. However, the variability in dioxin contamination has proved a major obstacle in formulating the decontamination program. The outbreak of chloracne among the schoolchildren suggests that the local authority may have minimized the dangers of contamination.

77-1028. Fel, P.; Zala, I.; Szule, E.; Varga, L. (Gyor-Sopron Megyei Tanacs Korhaz-Rendolointezete, Urologiai Sebeszeti Osztaly, Gyor, Hungary). **Haemdialysissel gyogyitott diquat-dibromide (Reglone) mergezes. [Hemodialysis in diquat poisoning.]** *Orvosi Hetilap* 117(29): 1773-1774; 1976. (17 references) (Hungarian)

Acute poisoning due to the accidental intake of less than a mouthful of diquat in a 53-yr-old man is reported. Nausea, emesis, and diarrhea were the first symptoms. General detoxication with adsorbents was initiated shortly after poisoning. The patients developed azotemia, oliguria and anuria despite forced diuresis for 2-3 days, which called for hemodialysis for 6-7 hr daily at 2-3 day intervals. He developed bilateral pneumonia, which responded to antibiotic therapy, during the second week. The patient was discharged on the 26th day in good condition. The course of the poisoning with its three phases (gastrointestinal, renal and pulmonary) was typical.

77-1029. Favennec, M.-J.; Favennec, F. (Rennes, France) **Les maladies cutanees en agriculture. [Skin diseases in agriculture.]** *Ouest Medical* 29(5): 395-402; 1976. (24 references) (French)

Pesticides are among the many causes of allergic dermatites in agriculturalists. They include synthetic fungicides, such as maneb, zineb, thiram, and ziram; synthetic insecticides, such as organochlorines and organophosphates, and synthetic herbicides, based on quaternary ammonium or pentachlorophenol. Growth regulators, rodenticides, and adjuvants have not been known to produce allergic reactions.

77-1030. Chugh, K. S.; Singhal, P. C.; Sharma, B. K.; Das, K. C.; Datta, B. N. (Div. Nephrol., Postgrad. Inst. Med. Educ. Res., Chandigarh, India). **Acute renal failure following copper sulphate intoxication.** *Postgrad. Med. J.* 53(615): 18-23; 1977. (26 references)

Eleven out of a series of twenty-nine patients (37.9%) with acute copper sulfate poisoning developed acute renal failure. Intravascular hemolysis appeared to be the chief factor responsible for renal lesions in these patients. Histological lesions observed in the kidney varied from those of mild shock to well established acute tubular necrosis. In one case, granulomatous lesions were seen in response to tubulorrhexis. Renal failure was the chief indication for dialysis in ten patients, whereas one patient was dialyzed primarily for removal of copper. Notwithstanding the adequate control of uremia by dialysis, only six of the eleven patients recovered. Septicemia was responsible for death in three, hepatic failure in one and methemoglobinemia in another. It is postulated that release of copper from hemolyzed red cells during acute hemolytic episodes may initiate, or contribute to, the development of renal damage.

77-1031. Prerovska, I. (Dep. Occup. Med., Karlovy Univ., Prague, Czechoslovakia). **Kardiovaskularni zmeny zpusobene ruznymi faktory pracovniho prostredi. [Cardiovascular changes caused by various factors of the working environment.]** *Pracov. Lek.* 28(9): 321-328; 1976. (67 references) (Czech)

Disorders of the cardiovascular system which may be induced by exposure to chemicals or aggressive dusts are discussed. Pathologic findings are reviewed. Due to the fact that cardiovascular changes in occupational diseases are not specific for these diseases alone, and similar findings are obtained in internal medicine, differential diagnosis of their etiology must be considered. Cardiovascular reactions to occupational damage are usually secondary in nature. Physical and chemical factors may be responsible. Organochlorine, organophosphate, phenoxy acid, nitro, and inorganic pesticides have been reported as causing cardiovascular damage.

77-1032. Komarova, L. I. **K voprosy o vliyanii khlororganicheskikh pestitsidov na razvitie zabolevanii sistemy krovi. [Concerning the influence of chloroorganic pesticides on the development of blood system diseases.]** *Probl. Gematol. Pereliv. Krovi.* 21(11): 46-50; 1976. (7 references) (Russian)

The frequency of prolonged contact with pesticides was much greater among patients with various forms of leukemia, hypoplastic anemia and hemorrhagic diathesis than among patients with nonhemorrhagic diseases. Cytochemical changes were found in the leukocytes of practically healthy persons engaged in the production and use of chlooroganic pesticides. The amount of DDT and of its main metabolite DDE proved to be greater in the hemopoietic organs of persons who died of hypoplastic anemia than in their subcutaneous cellular tissue - the main depot of the pesticides accumulating in the organism. An unfavorable influence of the prolonged DDT action on the course of the leukemia process was confirmed in experiments on animals.

77-1033. Lipparini, L.; Kovacs, A. (Inst. Merceol., Univ. Bologna Cent. Esperienze Ric., Bologna, Italy). **La lotta antiparassitaria e il problema dei residui: situazione attuale e prospettive future. [Pesticides and residue problem: current status and future prospects.]** *Quad. Merceol.* 12: 63-110; 1973. (70 references) (Italian)

The problem of pesticide residues in agricultural food products is reviewed. The principal laws and regulations passed by EEC/FAO/WHO and some European countries in the last few years are described. The presence of pesticide residues in fruit and vegetables is examined on the basis of recent analytical results. The prospects for the use of new pesticides especially "third generation" insecticides, are discussed.

77-1034. Toyonaga, K.; Tokuda, S. (Dep. Intern. Med., Okinawa Prefect. Centr. Hosp. Okinawa, Japan). **[Physiological examination and treatment by clonazepam of action myoclonus due to methyl bromide intoxication.]** *Rinsho Shinkeigaku (Clin. Neurol.)* 16(11): 830-831; 1976. (Japanese)

A case of myoclonic convulsions spreading from the right hand to the whole body of a 39 year old man

engaged in fumigation with methyl bromide was described. The convulsive condition became serious, with abnormally high values of bromine in serum and urine. Action myoclonus appeared with the recovery of consciousness, and was relieved with 60 mg/day of diazepam. However, because of severe somnolence, the treatment was changed to clonazepam at 3-4 mg/kg. This treatment was effective, resulting in conspicuously decreased myclonus, and the somnolence disappeared. In the first stage, paroxysmal EEG waves were seen in the left parietal region; however, afterwards paroxysmal EEG waves corresponding to the action potential of the right thumb muscle were not seen. The mode of action of clonazepam in action myoclonus is discussed.

77-1035. Yuasa, T.; Horikawa, Y.; Tsubaki, T. (Dept. Neurol., Brain Res. Inst., Niigata Univ., Niigata, Japan). **[Benzene hexachloride (BHC) and plasma cell dyscrasia associated with various other symptoms.]** *Shinkei Naika (Neurol. Med.)* 5(1): 105-108; 1976. (14 references) (Japanese)

The etiology of a special type of plasma cell dyscrasia was discussed. This disease was associated with pigmentation, polyneuropathy, and various other symptoms. It began to occur in 1965, more frequently in Japan (32 cases) than in other countries, with special geographical distribution (more frequently in western Japan and extremely rare in northern and northeastern Japan). It is more often found in males, without a specific occupational predilection. Several epidemiologic factors rule out an infectious origin because of sporadic occurrence. The possibility of attributing the cause to residual BHC in the human body was raised. This suspicion is partly based on the relatively high BHC residues in the adipose tissue of liver and peritoneum found in 2 autopsied patients with this disease. The other reason is the fairly good coincidence of the regional distribution of the occurrence of the disease and that of amounts of BHC application. The reproducibility of the disease in laboratory animals administered BHC should be examined. The experiment is now under way.

77-1036. Kaskevich, L. M. (All Union Sci. Res. Inst. Hyg. Toxicol. Pestic. Polym. Plastics, Kiev, USSR). **Sostoyanie biliarnoi sistemy u rabotayushchikh s pestitsidami. [State of the biliary system in subjects working with pesticides.]** *Vrach. Delo* 4: 132-135; 1976. (3 references) (Russian)

The pathology of the biliary tract in workers exposed to pesticides is characterized by dyskinetic changes the character of which should be considered in the therapeutic measures. The possibility of a latent course of inflammatory changes of the biliary tract is indicated. Fractional duodenal tubing with examination of the physico-chemical properties of the bile is recommended to determine the character of dyskinetic changes and detect he inflammatory agent.

77-1037. Yurchenko, I. V.; Kazakevich, R. L.; Sasinovich, L. M. (All-Union Sci. Res. Inst. Pestic. Polym. Plastics, Kiev, USSR). **Nervno-somaticheskie narusheniya pri dlitel'nom vozdeistvii tetrametiltiuramdisul'fida. [Neuro-somatic disorders due to prolonged effect of tetramethylthiuram disulfide.]** *Vrach. Delo* 4: 135-138; 1976. (12 references) (Russian)

The clinical peculiarities and pathogenesis of nervous disorders due to occupational exposure to TMTD (thiram) are described. Changes of the nervous system were manifested by vegetative-vascular and asthenic disturbances with some signs of dysfunction of the subcortical and brain-stem structures and a tendency to hypertensive vascular reaction in 52% of subjects. Inhibition of the hormone-forming thyroid function with thyroid gland hyperplasia, increased excretion of adrenalin and noradrenalin and a reduced ratio of sympathicoadrenal dissociation were observed in one subject. The content of blood copper and activity of blood ceruloplasmin were reduced. The relationship between abnormal copper metabolism and hepato-cerebral syndrome on the one hand and thyroid and adrenal dysfunction on the other is discussed. Recommendations on pathogenetic and symptomatic therapy are given.

77-1038. Kosachevskaya, P. I.; Baran, N. A. (Dep. Comm. Hyg., Kiev Inst. Postgrad. Med Studies, Kiev, USSR). **Gigienicheskaia otsenka vody posle obrabotki pochvy pestitsidom ialanom. [Hygienic quality of water after treatment of soil with yalan.]** *Vrach. Delo* (9): 136-137; 1976. (Russian)

The effect of yalan (molinate) on the organoleptic properties and self-purification of water was studied. The LD50 values are 584 mg/kg for rats and, 1,200 mg/kg for mice. The odor threshold in water was found to be 0.025 mg/l. When added to water in this concentration, the odor of the water persisted for 3 days, while it did not interfere with the self-purification processes at all. Added to water at 0.1 mg/l concentration, it caused a 40% reduction in the biochemical oxygen demand and also inhibited the oxidation of ammonia to nitrites. The maximum allowable concentration of yalan in water bodies is set at 0.025 mg/l.

77-1039. Heller, H. (Inn. Abt. Kathol. Krankenh., Erfurt, DDR). **Ergebnisse von Reihenuntersuchungen beim Umgang mit Pflanzenschutz- und Schaedlingsbekaempfungsmitteln. [Results of series studies during pesticide handling.]** *Z. Gesamte Inn. Med. Ihre Grenzgeb.* (5 references) (German)

The incidence of health impairment among farmers who handle pesticides is discussed. The necessity for annual check-ups that include measurement of cholinesterase and transaminases, a thymol test, and G-6-PhD measurements is stressed. The number of persons subject to such tests should be increased.

77-1040. Funke, K.; Goehler, G.; Futh, U.; Lignitz, E. (Nephrol. Abt., Bezirkskrankenhauses Staedt. Krankenanst., Potsdam, DDR). **Zur Klinik, Therapie und Morphologie der Paraquatvergiftung. [Clinical aspects, therapy and morphology of paraquat poisoning.]** *Dtsch. Gesundheitswes.* 31(45): 2143-2145; 1976. (11 references) (German)

After ingestion of a small amount of the herbicide, Gramoxone (paraquat) a child developed renal failure and some time later pulmonary failure which led to death on the fifth day after ingestion. Before clinical symptoms appeared, lung changes were detectable by means of X-ray pictures. Emergency therapeutic measures included those designed to eliminate the poison immediately after ingestion, as well as hemodialysis together with the administration of antibiotics and corticosteroid. Changes in the lungs were the predominant morphological feature, and are described in detail.

See also **77-0986** **77-0997** **77-1000** **77-1013** **77-1038** **77-1082** **77-1104**

77-1041. Mueller, W.; Schewe, T. (Inst. Physiol. Biol. Chem. Humboldt-Univ. Berlin, Berlin, Germany). **Das Systemfungizid Tridemorph als Hemmstoff der Atmungskette von Elektronentransport-partikeln aus Rinderherzmitochondrien. [The systemic fungicide tridemorph as a dual-site inhibitor of the respiratory chain of electron transfer particles from beef heart mitochondria.]** *Acta Biol. Med. Ger.* 35(6): 693-707; 1976. (41 references) (German)

Laboratory studies indicate that tridemorph (*N*-tridecyl- 2,6-dimethylmorpholine) inhibits the NADH-oxidase and the succinate-cytochrome C oxidoreductase system of non-phosphorylating electron transfer particles from beef heart. The concentration required for half-inhibition amounted to 3.4 μM and 24 μM respectively. Two different sites of action in the respiratory chain could be localized by means of difference spectroscopy and measurements of enzymic activities as well as the suppression of the NADH-induced reduction of all cytochromes on the one hand and the insensitivity of the NADH-ferricyanide oxidoreductase system on the other argue in favor of a site of action similar to rotenone. The partial suppression of the succinate-induced reduction of cytochrome b with simultaneous complete inhibition of the reduction of the other cytochromes indicate an additional site of action analogous to antimycin A. Both inhibitory actions appeared instantaneously after the addition of tridemorph and were counteracted by serum albumin. Furthermore, tridemorph inhibited the oxidation of external ferrocytochrome c but not that of ascorbate/tetra methyl-*p*-phenylene diamine HCl (TMPD) showing that it is not a true inhibitor of the cytochrome oxidase. The TMPD-induced bypass of the succinate oxidation was inhibited as well. The possible role of the inhibition of the main pathway of the respiratory chain for the fungicidal action of tridemorph is discussed.

77-1042. Ahmed, M. M. (Dep. Anat., Fac. Med., Univ. Singapore, Singapore, Malaysia). **Changes in the ultrastructure of satellite cells of slow loris in tricresylphosphate poisoning.** *Acta Neuropathol.* 37(2): 173-175; 1977. (14 references)

Toxic reaction of satellite cells from posterior root ganglia of slow loris in TCP poisoning is described. The satellite cells in experimental animals show a marked increase in the rough ER, Golgi complex, microvesicles and filaments. Furthermore there is also an increase in the number of dense bodies and mitochondrial density in these cells. The significance of these changes is discussed and it is concluded that in TCP poisoning not only the neurons but the supporting cells are also affected.

77-1043. Noda, K. (Dept. Obstet. Gynecol., Kinki Univ. Sch. Med., Osaka, Japan). **Studies on prevention of cervical carcinoma.** *Acta Obstet. Gynaecol. Jpn. Engl. Ed.* 22(4): 206-207; 1975.

Studies were performed, aimed at delineating the histopathological nature of atypical epithelial lesions in the uterine cervix and elucidating their epidemiology. Cancerization experiments were also performed on dd strain mice using the 20-methylcholanthrene string method. They resulted in a cancerization degree of 75% in the ninth week. A number of substances were tested for inhibition or promotion of this process. Heparin and bamfolin (an extract of young bamboo leaves) inhibited cancerization, while DDT promoted it.

77-1044. Guzman, J. A.; Puchmuller, A.; Guardia, T.; Carlini, M. R.; Pollini, R. B. (Dep. Farmacol., Univer. Nac. de San Luis, San Luis, Argentina). **Estudio comparativo de los efectos de tres insecticidas organofosforados sobre la superviviencia y actividad colinesterasica del *Bufo arenarum*. [Comparative studies of the effects of three organophosphate insecticides on the survival and cholinesterase activity of *Bufo arenarum*.]** *Acta Physiol. Lat. Amer.* 25(3): 246; 1975. (Spanish)

Recent experiments have shown that *B. arenarum* is not affected by exposure to a medium fumigated with 220 mg/m^2 malathion but is fatally harmed by low doses injected either into the lymphatic system (375 mg/kg) or into the artery (185-375 mg/kg). It does not react to parathion administered in the same manner. Malathion causes a greater decrease in cerebral than in plasmatic cholinesterase activity (71% and 12% respectively). Parathion has a greater effect on the plasmatic than on cerebral enzymatic activity (35% and 6% respectively). DFP injected into the lymphatic system or into the artery at 4 mg/kg does not produce signs of toxicity but the same dose injected intraperitoneally is fatal within 30 to 60 seconds.

77-1045. Ohkawa, J.; Mikami, N.; Miyamoto, J. (Res. Dep., Pestic. Div., Sumitomo Chem. Co. Ltd., Takarazuka, Hyogo, Japan). **Stereoselectivity in metabolism of the optical isomers of cyanofenphos (*O*-*p*-cyanophenyl *O*-ethyl phenylphosphonothioate) in rats and liver microsomes.** *Agric. Biol. Chem.* 41(2): 369-376; 1977. (16 references)

The racemic, (+)- and (-) forms of cyanofenphos (*O*-*p*-cyanophenyl *O*-ethyl phenylphosphonothioate) were rapidly metabolized in the rat by cleavage of P-O-aryl linkage, cleavage of P-O-alkyl linkage and conjugation of *p*-cyanophenol with sulfuric acid. There was a marked difference in the proportion of the major urinary metabolites, *p*-cyanophenol and *p*-cyanophenyl sulfate, with three forms of cyanofenphos. The three forms of cyanofenphos were metabolized at almost equal rates in the rat liver microsomes-NADPH system. (+)-Cyanofenphos underwent oxidation of P=S to P=O and cleavage of P-O-aryl linkage predominantly. In contrast, the (-)-isomer was converted to the corresponding oxon analog by mixed function oxidase, and then the oxon analog was rapidly hydrolyzed to *p*-cyanophenol by microsomal arylesterase-type enzyme. This microsomal enzyme had a remarkable selectivity in hydrolyzing (-)-cyanofenphos oxon versus the (+)-isomer. Stereoselec-

tivity in the metabolism of the cyanofenphos isomers in the rat appears likely to be mainly due to selective hydrolysis of the (-)-oxon analog by the arylesterase-type enzyme. (Author abstract by permission)

77-1046. Ovchinnikova, M. F. (Agrobiol. St., Moscow State Univ., Moscow Oblast, USSR). **Dinamika nekotorykh svoistv dernovo-podzolistoi pochvy v sviazi s primeneniem simazina i prometrina. [Dynamics of some properties of meadow podzol soils after use of simazine and prometryne.]** *Agrokhimiia* (11): 108-115; 1976. (27 references) (Russian)

The effects of prometryne and simazine on some physical and chemical properties of meadow podzol were studied in field tests. Sunflower fields were treated with 2.5 kg/ha doses of prometryne one day after sowing, and corn fields were treated with 2.5 kg/ha doses of simazine 6 days after sowing in three consecutive years. The pesticides had no influence on the biological processes taking place in the soil, nor on the seasonal variations of the physical parameters (temperature, moisture content). Temporary reduction of the soil respiratory activity was observed after pesticide application.

77-1047. Anonymous. **Report on carcinogenesis bioassay of technical grade chlordecone (Kepone).** *Am. Ind. Hyg. Assoc. J.* 37(12): 680-681; 1976.

Chlordecone (Kepone) was incorporated at two dosage levels in the feed of male and female Osborne-Mendel rats and B6C3Fl mice. The pesticide treatment was continued for 80 wk and the animals were killed 90 (mice) or 112 wk (rats) after the start of the study. The tests were conducted by the National Cancer Institute (NCI). Significant increases in liver cancer (hepatocellular carcinoma) were observed in rats fed high dosages of chlordecone (24-26 ppm) and in mice fed both high and low dosages (20-40 ppm). At these dose levels, liver tumors appeared in 6.9% of male rats, 22% of female rats, 81% (low dose) to 88% (high dose) of male mice and 475 (high dose) to 525 (low dose) of female mice. Liver tumors did not appear in male or female rats or female mice not treated with chlordecone. The control and pesticide-treated animals showed no significant differences in the incidence of other types of tumors although the chlordecone-treated animals showed increased incidence of generalized tremors, skin changes, and extensive hyperplasia of the liver.

77-1048. Rios de Molina, M. C.; de Calmanovici, R. W.; Tomio, J. M.; San Martin de Viale, L. C. (Dep. Quim. Biol., Univ. Buenos Aires, Argentina). **Porfiria inducida en ratas por hexachlorobenceno. Accion de la droga sobre el contenido de porifirinas y la actividad de la uroporfirinogeno decarboxilasa en distintos organos. [HCB-induced porphyria in rats. Effect of the drug on the porphyrin content and uroporphyrinogen decarboxylase activity in various organs.]** *An. Assoc. Quim. Argent.* 63(5/6): 313-332; 1975. (31 references) (Spanish)

The effects of hexachlorobenzene (HCB) were studied on the porphyrin content and uroporphyrinogen decarboxylase activity in Wistar rat liver, spleen, and blood. In the liver, the drug produced a significant accumulation of porphyrins (3,000 times greater than normal) and a marked decrease in enzyme activity. The porphyrins consisted of the 70-75% 8- and 30-35% 7-COOH. Studies on erythropoietic tissue showed that in the blood there were no alterations in the formation and transformation of porphyrins and enzyme activity remained unaffected. In the spleen, there was an accumulation of 8- and 7-COOH about 170 times greater than normal; enzyme activity was only slightly greater than normal. The liver appears to be the main site of the drug's effects.

77-1049. Faudemay, F.; Griffaton, G.; Dupuy, F.; Rozen, R.; Lowry, R. (Lab. Nutr. Hum. Ec. Prat. Hautes Etud. Hop. Bichat, Paris, France). **Effects a court terme de regimes a teneur elevee en dithiocarbamates sur le metabolisme glucidique et lipidique du foie de rat. [Short-term effects of diets with high dithiocarbamate levels on hepatic sugar and lipid levels in rat.]** *Ann. Nutr. Aliment.* 29(5): 375-394; 1975. (31 references) (French)

The liver metabolic response to various stimuli was compared in dithiocarbamate-fed and non-contaminated rats in order to establish the possible "metabolic toxicity" of pesticide-contaminated diets. For 15 days 112 weanling male Wistar CF rats were fed a semi-synthetic control diet. They were then divided into 4 lots: the control group C, which went on to receive the same diet; the nabam group N, the diet of which was supplemented with 275 ppm of the dithiocarbamate; the thiram group R, receiving the control diet + 600 ppm thiram; and the zineb group Z, given the control diet + 3,600 ppm zineb. The animals were fed these diets for 14 days; their dithiocarbamate intake thus averaged 1/20 p.o. LD 50/rat/day. At the end of this 2-week period, each of the 4 groups was divided into 4 sub-groups, all the animals were fasted overnight, then sacrificed: after no other treatment (subgroups T); 30 minutes after an i.p. injection of 2.6 g/kg glucose (subgroups G); after having been forced to walk in a restraint wheel for 50 minutes/hr during the 18 hrs of the night fast (sub-groups W); and after a 90 minute exposure in a cold room (F). The weights of the animals, of their liver, heart, kidneys, adrenals and epididymal pads were recorded. In their liver, the following compounds were determined: water, proteins, total lipids, triglycerides, long-chain acyl-CoA, non-esterified fatty acids, total cholesterol, glycogen, glucose, and α-glycerophosphate. The thiram rats had a lower food intake than the others and the smallest body weight, but their relative liver and kidney weights were the highest. The nabam animals did not differ from the control ones but the zineb rats had the lightest epididymal fat pads. The primary effects of the dithiocarbamate diets on liver metabolism were apparently not the same in the 3 groups compared to the control ones: nabam and thiram increased glycogen, thiram in-

creased the lipid compounds (long-chain actyl-CoA and triglycerides), whereas zineb feeding resulted in an increase of glucose concentration and a decrease of triglycerides and total lipids. Muscular exercise and/or cold exposure caused a greater glucose utilization in the nabam and thiram rats, and a smaller glycogen and glucose utilization, associated with an increase of α-glycerophosphate, in the zineb animals. Dithiocarbamates thus impaired glucose utilization by the liver. Also, fat mobilization from peripheral depots was shown to occur in the 3 experimental groups, resulting in liver fatty acid oxidation in the nabam and zineb rats, and in liver steatosis for the thiram ones. These metabolic disorders are tentatively ascribed to hormonal changes, and the working hypothesis of a para-diabetic status of the animals fed with a dithiocarbamate-containing diet has been advanced.

77-1050. Periquet, A.; Derache, R. (Groupe Rech. Toxicol. Alim. Boisissons, Inst. Physiol., Toulouse, France). **Influence d'un regime alimentaire hypoproteique sur la toxicite aigue d'un pesticide: le nabame. [Effect of low-protein diet on acute toxicity of nabam.]** *Ann. Nutr. Aliment.* 30(1): 29-44; 1976. (35 references) (French)

The LD_{50} of nabam for rats fed a low-protein diet was lower than for rats given higher levels of protein. Male rats were fed for twenty-eight days from weaning with semi-synthetic isocaloric diets containing 3.5% and 26% casein and with a standard laboratory diet. The production or activity of detoxicating microsomal hepatic enzymes, which a restriction of nitrogen supply could reduce, may explain the results. The pathological-clinical syndrome of toxicity (stimulation then depression of the central nervous system, severe inflammation of the gastro-intestinal tract, renal necrosis) was essentially the same among all the animals.

77-1051. Subba-Rao, R. V.; Alexander, M. (Lab. Soil Microbiol., Dep. Agron., Cornell Univ., Ithaca, NY 14853). **Products formed from analogues of 1,1,1-trichloro-2,2-bis (*p*-chloro-phenyl) ethane (DDT) metabolites by *Pseudomonas putida*.** *Appl. Environ. Microbiol.* 33(1): 101-108; 1977. (18 references)

Cultures of *Pseudomonas putida* growing in solutions with diphenylmethane as sole carbon source formed 1,1,1',1'-tetraphenyldimethyl ether. The product was identified by gas chromatography, mass spectrometry, and infrared and nuclear magentic resonance spectrometry. The formation of benzophenone, benzhydrol, and phenylglycolic acid was established by gas chromatography and mass spectrometry. Similar techniques also revealed that phenylacetic acid was a major metabolite. Resting cell suspensions converted benzhydrol to phenylglycolic acid and products tentatively identified as hydroxybenzhydrols and a hydroxybenzophenone. Cell suspensions of the bacterium also converted the tetraphenyldimethyl ether to benzhydrol and benzophenone. Possible pathways for the degradation of these analogues of 1,1,1-trichloro-2,2-bis (*p*-chlorophenyl) ethane (DDT) metabolites are discussed.

77-1052. Bourquin, A. W. (U.S. Environ. Prot. Ag., Gulf Breeze Environ. Res. Lab., Sabine Island, Gulf Breeze, FL). **Degradation of malathion by salt-marsh microorganisms.** *Appl. Environ. Microbiol.* 33(2): 356-352; 1977. (30 references)

Numerous bacteria from a salt-marsh environment are capable of degrading malathion, an organophosphate insecticide, when supplied with additional nutrients as energy and carbon sources. Seven isolates exhibited ability (48 to 90%) to degrade malathion as a sole carbon source. Gas and thin-layer chromatography and infrared spectroscopy confirmed malathion to be degraded via malathion-monocarboxylic acid to the dicarboxylic acid and then to various phosphothionates. These techniques also identified desmethyl-malathion, phosphorothionates, and four-carbon dicarboxylic acids as degradation products formed as a result of phosphatase activity.

77-1053. Krzeminski, S. F.; Gilbert, J. T.; Ritts, J. A. (Rohm and Haas Co. Res. Labs., Spring House, PA 19477). **A pharmacokinetic model for predicting pesticide residues in fish.** *Arch. Environ. Contam. Toxicol.* 5(2): 157-166; 1977. (13 references)

By using the compartmental analysis approach of pharmacokinetics, found useful in describing the kinetics of a foreign compound in a biological system, a rather simple mathematical model was developed to predict, by computer simulation, steady-state pesticide residues in fish from limited pre-steady-state experimental data. Such steady-state data are needed in order to calculate the tendency of the residue to concentrate in fish—the so-called bioconcentration factor. The model was applied to four different carbon-14 labeled biocides at seven concentrations. Considering the simplicity of the model and the fact that residues were measured by the non-specific technique of radioassay, model predicted values were in good agreement with experimental values. (Author abstract by permission)

77-1054. Magallona, E. D.; Gunther, F. A.; Iwata, Y. (Dep. Entomol., Univ. of the Phillipines College, Laguna, Philippines). **Synthesis and spectroscopic characterization of acetyl (polychloro) and nitroso derivatives of carbaryl and three possible metabolites.** *Arch. Environ. Contam. Toxicol.* 5(2): 177-183; 1977. (16 references)

Acetyl (polychloro) (Cl = 0, 1, 2, or 3) and nitroso derivatives of carbaryl, 1-naphthol, 5-hydroxycarbaryl, and 1,5-naphthalenediol were synthesized. Compounds were characterized by infrared, mass, and nuclear magnetic responance spectroscopy. *N*-chloroacetylation (Cl=0, 1, 2, or 3) of carbaryl was readily accomplished through the pyridine-catalyzed reaction of carbaryl with the appropriate acid chlorides. Trichloroacetylation was also possi-

ble through the pyridine-catalyzed reaction with the anhydride. *N*-nitrosation could also be done readily. *N*-nitroso- and *N*-trichloroacetyl carbaryl underwent decomposition to carbaryl on exposure to atmospheric moisture and could be maintained in the pure state only with difficulty. The other derivatives were stable under normal storage conditions. (Author abstract by permission)

77-1055. Grant, D. L.; Phillips, W. E. J.; Hatina, G. V. (Health Protect. Br., Bur. Chem. Safety, Ottawa, Ontario, Canada). **Effect of hexachlorobenzene on reproduction in the rat.** *Arch. Environ. Contam. Toxicol.* 5(2): 207-216; 1977. (21 references)

This study was designed to determine the effect of hexachlorobenzene (HCB) on rat reproduction. Dietary concentrations of 0, 10, 20, 40, 80, 160, 320, and 640 ppm of HCB were fed to Sprague-Dawley rats in a four generation reproduction study. Pregnancy (number of dams whelping/number of dams mated), viability (pups surviving 5 days/pups born alive), and lactation (pups weaned/live pups on day 5 less culls) indices were measured. Body weight gain of pups was monitored. HCB residues were measured in the 21-day-old pups of the F_1a and F_2a generations. The two highest dietary concentrations were toxic to the F_0 generation females and 50% and 20% respectively, died. Suckling pups were particularly sensitive and many died prior to being weaned. The viability index was zero in the F_1a and F_1b generations for pups from dams fed 320 and 640 ppm of HCB and only 55% for the 160 ppm group. The lactation index decreased from 30% for the F_1 and F_1b generation pups to 0 for the F_2a and F_2b generation pups in the 160 ppm group. Also, the lactation index decreased from 93% in the F_1a generation to 40% in the F_2b generation for the 80 ppm group. Birth, 5-day and 21-day body weights of pups were decreased by treatment. HCB residues accumulated in the pups in a dose-related manner. The relative liver weight and aniline hydroxylase activities were increased in weanlings from dams fed 40 ppm of HCB. No gross abnormalities were observed in the pups. (Author abstract by permission)

77-1056. Daorai, A.; Menzer, R. E. (Dep. Entomol., Univ. Maryland, College Park, MD 20742). **Behavior of abate in microorganisms isolated from polluted water.** *Arch. Environ. Contam. Toxicol.* 5(2): 229-240; 1977. (11 references)

Water collected from the Denton sewage lagoon and the Wye Institute farm pond showed some effects on the degradation of Abate (temephos). There was some indication of greater radioactivity in the water after extraction, which might indicate hydrolytic metabolism of Abate. Greater amounts of radioactivity in the aqueous fractions after extraction resulted from the sewage lagoon water than the farm pond water. However, there was no difference between the various sources of water in the oxidative metabolism of Abate which would result in metabolites in the organic-solvent extract of the water. The microorganisms used in this study were isolated from the Denton sewage lagoon water. The selective isolate, which is possibly a *Pseudomonas* sp., could break down Abate into water-soluble compounds and convert Abate into highly polar metabolites. However, the metabolites resulting from incubation of Abate with microorganisms, medium-only controls, and distilled water were the same; only the relative amounts of the metabolites were different between a selectively isolated microorganism, a general isolate, and the controls. Abate was found to be the major compound isolated in every test. Some of the metabolites, which have been found in other studies of the metabolism of Abate, were not found in this study, but several other metabolites, which have not been found by others, were present. The medium used in this experiment also showed some effects on the degradation of Abate. The general isolate seemed to have very little effect on Abate. (Author abstract by permission)

77-1057. Muacevic, G. (C. H. Boehringer Sohn, Abt. Pharmakol., Ingelheim am Rhein, West Germany). **Acute toxicity and cholinesterase inhibition in vivo of chlorthiophos.** *Arh. Hig. Rada Toksikol.* 27(1): 3-14; 1976. (11 references)

Oral and dermal LD_{50} values of chlorthiophos were determined for a variety of experimental animals. The oral LD_{50} values were: rat, 13 mg/kg; mouse, 141 mg/kg; guinea-pig, 58 mg/kg; rabbit, 20 mg/kg; quail, 45 mg/kg; hen, 45 mg/kg, and dermal LD_{50}: for rat, 58 mg/kg and for rabbit, 48 mg/kg. No signs of neurotoxicity in hens were observed. In rats, a maximal inhibition of erythrocyte cholinesterase was found after two hours, of plasma cholinesterase after four and of brain cholinesterase after six hours, with a return to normal in the blood observed after four days and in the brain after eight days. Lindane and phenobarbital pretreatment reduced the acute toxicity of chlorthiophos. Atropine and some oximes (obidoxime chloride and trimedoxime bromide) antagonized the toxic effects.

77-1058. Stotter, D. A.; Thomas, R. D.; Wilson, M. T. (Dep. Chem., Univ. Essex, Wivenhoe Park, Colchester, England). **Reductive dechlorination of DDT by haem proteins.** *Bioorg. Chem.* 7(1): 87-93; 1977. (25 references)

DDT is converted to DDD (TDE) by reduced myoglobin (rapidly), cytochrome c oxidase, and a heme-containing undecapeptide derived from cytochrome c. Cytochrome c itself is inactive. This demonstrates that an accessible heme site is necessary for the reaction. Spectrophotometric evidence is presented for an interaction between DDT and the undecapeptide. These results cast light on one of the biological pathways for the breakdown of DDT.

77-1059. Selezneva, T. G.; Chebotarev, A. N. (Inst. Med. Genet., USSR Acad. Med. Sci., Moscow, USSR).

Zavisimost' tsitogeneticheskogo deistviya ot kontsentratsii tepa v kul'ture limfotsitov cheloveka. [Dependence of the cytogenic action on the tepa concentration in human lymphocyte culture.] *Byull. Eksp. Biol. Med.* 82(10): 1265-1267; 1976. (5 references) (Russian)

The authors studied the cytogenetic action of TEPA (tris-2-methyl -1- azyridinyl) on the human lymphocyte culture. It was shown that with the increase of the mutagen concentration from 0.125 to 16.0 μg/ml the cytogenetic effect for the portion of the aberrant metaphases rose from 6.0 to 61.0%, and for the total number of ruptures-from 7.96 to 116.3. A method of finding the minimum effective concentration of the substance under study in comparison with control is suggested; for TEPA it constitutes 0.120 μg/ml. The percentage of chromatid ruptures remained constant in using different TEPA concentration and constitutes 51.72%. Cell distribution of chromosome ruptures is satisfactorily described by a geometrical distribution.

77-1060. Amancio, S. (Lab. Biol. Cell. Veg., Univ. Paris VII, 75221 Paris Cedex 05, France). **Modifications ultrastructurales provoquees par un herbicide, le piclorame en formulation technique, (70,4%) chez une algue planctonique, le *Dunaliella bioculata* (Volvocales). [Ultrastructural alterations produced by technical picloram (70.4%) in a planktonic alge, *Dunaliella bioculata*.]** *C. R. Acad. Sci. Ser D* 285(11): 1337-1340; 1976. (7 references) (French)

Dunaliella bioculata cultures were treated with technical picloram (70.4%) at concentrations ranging from 200 to 500 μg/ml for five to seven days. At 250 μg/ml, picloram inhibited multiplication of the cells, the flagella of which fell off and lost their polarity. The plast, nucleus, Golgi apparatus, and vacuoli were ultrastructurally altered. At 400 μg/ml or more, picloram destroyed the alga completely within a few days.

77-1061. Ahmed, M. M.; Glees, P. (Inst. Histol. Neuroanat., Univ. Gottingen, Germany). **Mitochondrial degeneration after organic phosphate poisoning in prosimian primates.** *Cell Tiss. Res.* 175(4): 455-465; 1977. (26 references)

The degenerative reaction of mitochondria to tricresylphosphate (TCP) poisoning in spinal ganglion cells of Slow Loris (*Nycticebus coucang coucang*) were studied with the electron microscope. In neurones of animals treated with TCP, mitochondria display various stages of alterations which confirm mitochondrial involvement in TCP poisoning. The role of degenerated mitochondria in the formation of neuronal lipofuscin is discussed. It is suggested that the lipofuscin granule is a metabolic product inherently related to mitochondrial degeneration, irrespective of the primary cause: aging or intoxication.

77-1062. Vargova, M.; Rosival, L.; Batora, V. **Prispevok k toxicite *S*-metyl izomeru fenitrotionu. [A contribution to the toxicity of *S*-methyl isomer of fenitrothion.]** *Cesk. Hyg.* 21(10): 457-462; 1976. (10 references) (Czech)

An experimental study of the toxic effect of the *S*-methyl isomer of fenitrothion, a concomitant impurity of the technical product of fenitrothion (Metation EC-50), indicated that the acute toxicity of *S*-methyl isomer of fenitrothion in mice and rats is higher than that of fenitrothion. The LD_{50} of fenitrothion in mice was 1850 (1762-1942) mg/kg in rats 700 (675-725) mg/kg. The LD_{50} of the *S*-methyl isomer of fenitrothion in mice was 320 (246-416) mg/kg, and in rats, 315 (235-422) mg/kg. Repeated administration of *S*-methyl isomer of fenitrothion to rats did, however, result in lower toxicity in another test with fenitrothion. The I_{50} values for fenitrothion, and for the *S*-methyl isomer of fentrothion were determined using a lyophilized horse serum, human blood serum and a homogenate of mouse heads. The *S*-methyl isomer was by 2-3 orders a stronger inhibitor of cholinesterase than fenitrothion.

77-1063. Gupta, P. K.; Kaushal, M. (Dep. Biophys., Panjab Univ., Chandigarh, India). **Endrin intoxication in normal and irradiated rats. 1. Protein and glycogen pattern.** *Chemosphere* 6(1): 41-49; 1977. (24 references)

Irradiated (150 gamma rays per min for 6 min) and nonirradiated female albino rats were given 10 mg/kg endrin i.p. Nonirradiated endrin-treated rats showed increased liver weight and glycogen concentrations 2-48 hr after treatment. The kidney glycogen concentrations were significantly increased 24 and 48 hr after treatment and liver protein was significantly increased at 12 and 24 hr. There were no changes in kidney protein, body weight, or kidney weight. Radiation alone caused no changes in these parameters, but the liver and kidney glycogen concentrations were increased 6-48 hr after treatment in irradiated endrin-treated animals. There were no significant changes in body weight, liver, weight, kidney weight, or liver or kidney protein content in the latter group. Irradiation appeared to enhance the effect of endrin on liver and kidney glycogen concentrations and to decrease the effect of endrin on the protein concentrations of these organs.

77-1064. Jordan, W. P.; King, S. E. (Dep. Dermatol., Med. Coll. Virginia, Richmond, VA). **Delayed hypersensitivity in females. The development of allergic contact dermatitis in females during the comparison of two predictive patch tests.** *Contact Dermatitis* 3(1): 19-26; 1977. (17 references)

Female volunteers developed significantly more cell-mediated immune responses to chemical haptenes than men and had an overall higher rate of haptene recognition. Ten chemically different compounds were applied to the skin of the backs of male and female volunteeers to induce delayed hypersensitivity responses. The 10 compounds had a low, moderate, high or unknown allergenic

potential and were divided among five test panels (modified Draize) consisting of 150 subjects each. In each panel, 75 subjects (mean age 31 years) were always male prisoners (50% Caucasians) and the remaining 75 subjects (> 90% Caucasians) were divided, age-matched free males and females (mean age 24 years). Three compounds, each on different panels, had significantly higher sensitization rate in females than in free males or total males. The remaining compounds produced sensitization, usually in lower numbers, but females dominated in sensitization rates. Viewed as absolute rates of sensitization for the 10 compounds, females were higher on eight test compounds and tied on two when compared to all males. Seven of these 10 compounds were simultaneously tested for their sensitization potential by the modified maximization method (all males) in order to compare the two tests' ability to disclose potential sensitizers. Female sensitizations on the modified Draize accounted for this test's superiority. Sensitivity to captan and chloroethylamide was demonstrated. Prior exposure to these compounds cannot be assumed to be widespread, and therefore was apparently not a factor in these tests.

77-1065. Hesse, V.; Macholz, R. M.; Engst, R.; Kujawa, M.; Gruebner, I.; Petrich, E. (Kinderklin. Friedrich-Schiller-Univ. Jena, DDR). **Die Wirkung einer kurzzeitigen Hexachlorcyclohexan (HCH)-Exposition auf Serumenzyme des Menschen. [The effect of short-term exposure to hexachlorocyclohexane on serum enzymes of man.]** *Dtsch. Gesundheitswes.* 31(45): 2134-2137; 1976. (18 references) (German)

A short-term exposure to HCH-incubation did not lead to a significant increase of HCH (BHC) level in blood and urine and did not influence enzyme activities either immediately or after a period of 21-24 days. The HCH concentration in blood and urine was gas-chromatographically determined in 17 patients who were exposed to a short-term inhalation of smoke gas containing hexachlorcyclohexane (HCH), and the activity of the enzymes of alkalines phosphatase, alanine aminotransferase, aspartate aminotransferase, cholinesterase, leucyl arylamidase, creatine phosphokinase and γ-glutamyl transpeptidase in the serum was determined 2-4 hours after exposure, and again 21-24 days after exposure.

77-1066. Desi, T. F.; Varga, G.; Judit, C. G. (Orszagos Kozegeszsegugyi Intezet, Budapest, Hungary). **Klorozott szenhidrogen es szervesfoszfat pestzticid-adagolas immunoszuppressziv hatasanak vizsgalata. [Immune suppressive effect of chlorinated hydrocarbon and organic phosphate pesticide administration.]** *Egeszsegtudomany* 20(4): 358-368; 1976. (22 references) (Hungarian)

Lindane, malathion and DDVP (dichlorvos) suppressed agglutination in the course of a study of the humoral immune response of rabbits exposed to *Salmonella typhi* vaccine. Malathion and DDVP also caused a decrease of cholinesterase activity. Lindane caused increased elimination of BSP.

77-1067. Nehez, M.; Paldy, A. (Inst. Pub. Health Szeged, Hungary).; Selypes, A. **Nahany bakterium hatasa a dinitro-*o*-krezol tartalmu Krezonit E novenyvedoszerre a toxicitas turkreben. [Effect on certain bacteria on the toxicity of dinitro-*o*-cresol containing Krezonit E plant-protecting agent.]** *Egeszsegtudomany* 20(4): 369-372; 1976. (25 references) (Hungarian)

The LD50 of mice injected with DNOC that contained Krezonit E was determined before and after microbial decomposition of the DNOC. Decomposition was performed in broth cultures of *E. coli*, *P. vulgaris*, *B. cereus* and *B. subtilis*. The LD_{50} value was determined on the basis of the 24-hour death rate by the Litchfield-Wilcoxon method, and the DNOC effective agent with Parker's method. After microbiological decomposition the filtrates used for injection contained 28-58% less DNOC than before treatment. Thus, after microbial decomposition the LD_{50} values increased indicating that the metabolite or metabolites were less toxic after microbiological decomposition.

77-1068. Bus, J. S.; Aust, S. D.; Gibson, J. E. (Dep. Environ. Health, Kettering Lab. Univ. Cincinnati, Cincinnati, OH). **Paraquat toxicity: proposed mechanism of action involving lipid peroxidation.** *Environ. Health Perspect. 16: 139-146; 1976. (43 references)*

A mouse study supports the hypothesis that paraquat pulmonary toxicity results from cyclic reduction-oxidation of paraquat with sequential generation of superoxide radicals and singlet oxygen and initiation of lipid peroxidation. *In vitro* mouse lung microsomes catalyzed an NADPH-dependent, single-electron reduction of paraquat. Incubation of paraquat with NADPH, NADPH-cytochrome c reductase, and purified microsomal lipid increased malondialdehyde production in a concentration dependent manner. Addition of either superoxide dismutase or the singlet oxygen trapping agent 1,3-diphenyl isobenzofuran inhibited paraquat-stimulated lipid peroxidation. *In vivo*, pretreatment of mice with phenobarbital decreased paraquat toxicity, possibly by competing for electrons which might otherwise reduce paraquat. In contrast, paraquat toxicity in mice was increased by exposure to 100% oxygen and by deficiencies of the antioxidants selenium, vitamin E, or reduced glutathione (GSH). Paraquat, given IP to mice at 30 mg/kg, decreased concentrations of the water-soluble antioxidant GSH in liver and of lipid soluble antioxidants in lung. Oxygen-tolerant rats, which have increased activities of pulmonary enzymes which combat lipid peroxidation, were also tolerant to lethal doses of paraquat as indicated by an increased paraquat LT_{50}. Furthermore, rats chronically exposed to 100 ppm paraquat in the water had elevated pulmonary activities of glucose-6-phosphate dehydrogenase and GSH reductase.

77-1069. Greenberg, S. R.; Eisenberg, G. M. (Univ. Health Sci., Chicago Med. Sch., Chicago, IL 60612). **The**

pulmonary effects of benzyl viologen in Swiss mice. *Environ. Pollut.* 12(4): 255-259; 1977. (17 references) (English)

Benzyl viologen, a dipyridylium-derived substance like paraquat, was injected intraperitoneally in a single dose of 10 mg/kg to 40 Swiss mice. Examination of lung tissue showed that, within 24 hours of injection, the lungs became intensely edematous, congested, and hemorrhagic. The interstitial tissue was also edematous. The capillary walls were intact although dilated. The epithelial lining of the air sacs was damaged, and cellular debris was present in the lumina. Within 48 hours, some alveoli were partially lined by PAS-positive membranes, which persisted for about 96 hours and then began to disintegrate and be consumed by macrophages. Regenerating epithelial cells were observed over the alveolar basement membrane. The pulmonary interstitial tissue contained mononuclear cells. At the end of the experiment (30 days) the lungs contained patchy pneumonic areas, consisting of fibrous interstitium, distorted alveolar epithelial surfaces, and reducted the volume of the respiratory surface. Benzyl viologen seems capable of inducing the formation of hyaline membrane disease and interstitial pulmonary fibrosis.

77-1070. Vasilenko, N. M.; Volodchenko, T. S.; Baturina, T. S.; Kolodub, F. A. (Lab. Promyshl. Toksikol. Khar'kovskogo Nauchnoissled. Inst. Gig. Trud., Kharkov, USSR). **Toksikologicheskie osobennosti mononitrofenolov s uchetom izomernoi formy.** [**Toxicological peculiarities of mononitrophenols with regard to their isomeric form.**] *Farmakol. Toksikol. (Moscow)* 39(6): 718-721; 1976. (11 references) (Russian)

The toxicological features of 3 mononitrophenol isomers (*o*-, *m*-, and *p*-) characterize them as moderately or slightly toxic chemicals with a polytropic type of action. The degree of the toxicity depends upon isomerism. The most toxic was *p*-nitrophenol, a degradation production of parathion and other organophosphorus compounds, with an LD50 of 0.57 g/kg body weight in rats and 0.38 g/kg in mice.

77-1071. Filchenko, A. S. (Katedra Patol. Fiziol., Rostov-na-donu Med. Inst., Rostov-on-Don, USSR). **Izmenenie fazovoi struktury serdechnogo tsikla sobak pri ostroi intokikatsii khlorofosom.** [**Changes in the phasic structure of the cardiac cycle in dogs in acute chlorophos poisoning.**] *Farmakol. Toksikol. (Moscow)* 39(6): 728-731; (6 references) (Russian)

Chlorophos (trichlorfon) caused heart disorders in dogs. Experiments conducted on 11 listenon-curarized dogs demonstrated that chlorophos is capable of producing marked disorders in the mechanical activity of the heart. In poisonings of medium severity the phasic syndrome of hypodynamia develops; in grave cases hyperdynamia of the heart occurs.

77-1072. Domenech, C. E.; Machado de Domenech, E. E.; Balegno, H. F.; de Mendoza, D.; Farias, R. N. (Quim. Biol. Univ. Nac. Rio Cuarto, Cordoba, Spain). **Pesticide action and membrane fluidity. Allosteric behavior of rat erythrocyte membrane-bound acetylcholinesterase in the presence of organophosphorus compounds.** *FEBS Letters* 74(2): 243-246; 1977. (13 references)

To test the effects of organophosphate pesticides in membrane fluidity, erythrocyte membranes exhibiting low or high fatty acid fluidity were obtained from male Sprague-Dawley rats weaned on a basic diet suppmemented with 5% corn oil or lard. Before the addition the substrate, different enzymatic preparations of acetylcholinesterase were preincubated with parathion, ethion, and malathion (all at 5×10^{-7} *M*). The *n*-values (Hill coefficient) for the fluorine inhibition of membrane-bound acetylcholinesterase from rats fed the corn oil diet decreased with all three pesticides (1.6 to an average of 0.1). The *n*-values remained unchanged for the enzyme in soluble form (*n*: 1.6). The pesticides did not modify the *n*-values of membrane-bound enzymes from rats fed a lard supplemented diet. They only decreased the allosteric behavior of the membrane bound enzyme with a high double-bond index/saturated fatty acid ratio. The positive relationship between the *n*-values and membrane fatty acid fluidity and the fact that the soluble form of acetylcholinesterase was not affected suggest that pesticides decreased membrane fluidity. These results indicate that the pesticides used, besides inhibiting the enzyme at concentration levels of 10^{-7} M or higher, may produce changes in membrane fluidity at concentrations of 10^{-7} -10^{9} M. Although this effect was not observed in membrane-bound enzymes from rats fed a lard supplemented diet, it is still possible that the pesticides exerted their effects on the membrane since, in this case, the cooperative transitions of the membrane-bound enzyme were at their minimal expression.

77-1073. Gennari, P.; Raffi, G. B.; Baldi, E.; Boari, C.; Gaudarella, R. (Inst. Med. Lav., Cent. Antiveleni, Univ. Bologna, Italy). **Valutazione di alcuni indici di funzionalita epatica e renale in un gruppo di lavoratori cronicamente esposti ad agenti antiparassitari. Nota I.** [**Evaluation of some indices of hepatic and renal function in a group of workers chronically exposed to pesticides. Note I.**] *G. Clin. Med. (Bologna)* 56(11-12): 423-430; 1976. (90 references) (Italian)

Changes related to the liver were found in a group of 58 workers concerned in the preparation and the packaging of organophosphorus and organohalogen insecticides. A significant percentage of patients displayed alterations of the serum electrophoresis profile and in one case where it was possible to do a liver biopsy, there were histologic alterations of the hepatic parenchyma. The SGOT, SGPT, alkaline phosphatase, serum pseudocholinesterase, blood cholesterol, prothrombin time, and serum eucolloid tests all proved to be within the normal limits.

77-1074. Broda, C.; Nachtomi, E.; Alumot, E. (Inst. Anim. Sci., Agric. Res. Org., The Volcani Center, Rehovot, Israel). **Differences in liver morphology between rats and chicks treated with ethylene dibromide.** *Gen. Pharmacol.* 7(5): 345-348; 1976. (13 references)

Morphological changes were found in livers of rats and chicks after acute poisoning with ethylene dibromide (EDB). In rats, EDB induced sinusoidal dilations and centrilobular necrosis, beginning from 8 hr after poisoning. In chicks the central areas were almost unchanged and portal areas were found to be affected by EDB; the concentration of eosinophilic granulocytes was much greater EDB-treated livers than in controls.

77-1075. Ginoyan, M. M. (Kafedra Kommun. Gig. Tsentr. Inst. Usoversh. Vrachi, Moscow, USSR). **Eksperimental'nye dannye k gigienicheskomu obosnovaniyu predel'bo dopustimoi kontsentratsii okisi medi v atmosfernom vozdukhe. [Experimental data for hygienic substantiation of the maximum permissible concentration of copper oxide in the atmosphere.]** *Gig. Sanit.* 41(6): 8-12; 1976. (5 references) (Russian)

Copper oxide aerosol at concentrations from 1 to 0.01 mg/m^3 produced significant changes in the content of total protein and the ratio of protein fractions of the blood serum of male and female albino rats exposed to 90-100 days continuous inhalation. Copper oxide had a gonadotoxic effect on male rats. Concentrations of 0.002 mg/m^3 had no effect; this is recommended as the maximum permissible daily concentration for the atmosphere of populated areas.

77-1076. Panshina, T. N. (All-Union Sci. Res. Inst. Pestic. Polym. Plastic Mat., Kiev, USSR). **Gigienicheskie aspekty primeneniya v sel'skom khozaistve i toksikologiya nekotorykh gerbitsidov. [Hygienic aspects of agricultural use and toxicology of some herbicides.]** *Gig. Sanit.* 41(7): 38-41; 1976. (10 references) (Russian)

Threshold and subthreshold toxic doses of propanide (propanil), ramrod (propachlor) and solan were determined by long-term introduction into the gastrointestinal tract of animals. Maximum permissible daily doses for man, and permissible levels of propanide, ramrod and solan in food products, water and the workplace were calculated from these data. Control methods are also discussed.

77-1077. Dura, D.; Slobodnik, Yu.; Chuka, I.; Deshi, I. (Nat. Inst. Public Health, Budapest, Hungary). **Issledovanie vliyaniya pestitsidov na kul'turu tkani. [Effects of pesticides on cultured tissues.]** *Gig. Sanit.* 41(8): 82-86; 1976. (11 references) (Russian)

The effects of lindane, malathion, bromophos, trichlorfon, arprocarb (propoxur), dioxycarb, and benlate (benomyl) on M-7 simian kidney cell suspensions were studied. The formation of the monolayer and the morphological characteristics of the layer formed were investigated. The effect of the pesticides on monolayers manifested itself in the formation of loose, non-contiguous layers or of cell groups. The concentrations at which considerable impairment of the cell layer formation was observed were 10 ppm for dioxycarb, 50 ppm for malathion and bromophos, 100 ppm for lindane, and 200 ppm for trichlorfon, benlate and arprocarb. The findings indicate that the cell culture test can be used for a simple and fairly rapid assessment of pesticide toxicity.

77-1078. Polishchuk, D. I. (Sci. Res. Inst. of Indust. Hyg. Occup. Dis., Kiev, USSR). **Deistvie na organizm zhivotnykh aerozolia karbofosa razlichnoi dispersnosti. [Effects of carbophos aerosols at various dispersions on animals.]** *Gig. Sanit.* 41(8): 93-94; 1976. (Russian)

The influence of the particle size of monodisperse carbophos aerosols on various parameters of the toxicity of this pesticide was studied in adult male rats in acute and chronic inhalation tests. Particle sizes of 20, 50, 100, 200 and 300 microns were tested in single-time inhalation tests, 20 and 300 micron sizes in chronic inhalation tests (4 hours daily over 3 months). The toxic effect of carbophos was determined from the cholinesterase activity in the blood, erythrocytes and tissues, from the vitamin C level of the adrenals, and from the eosinophil count. Single-time inhalation of 300 micron aerosols caused only slight reduction of the cholinesterase activity; the rate of inhibition of this enzyme increased with decreasing aerosol particle size, reaching 50-70% at 20 microns. Similar findings were obtained in chronic inhalation tests, which also showed highly significant reduction of the absolute eosinophil count and of the vitamin C level in the adrenal in animals exposed to 20 micron aerosol. These animals also showed a highly significant increase in the reserve alkalinity of the blood. The findings indicate that aerosols with a particle size of 100-200 microns should be used for hygienic reasons.

77-1079. Shigan, S. A. (A. N. Sysin Inst. Gen. Commun. Hyg., Moscow, USSR). **Raschetyne metody v probleme gigienicheskogo normirovaniya khimicheskikh zagryaznenii vody. [Calculation methods in solving the problem of hygienic standardization of chemical contaminations of water.]** *Gig. Sanit.* 41(11): 15-20; 1976. (8 references) (Russian)

Regression equations for effects of chemically related groups of compounds were used to increase the reliability of predictions of the chronic-exposure toxicity of pesticides in water. The use of mathematical methods to predict toxicity from toxicometric parameters is reviewed, and the reliability of specific statistical procedures is assessed.

77-1080. Sapegin, D. I.; Kal'sada, I. N.; Kucher, A. G.; Muntian, E. N.; Rakov, A. A.; Severinov, I. S. (Crimean

Medical Institute, USSR). **Vliianie karbofosa i polikhlorpinena na obmen nekotorykh mikroelementov i vitaminov i skorost' dissotsiatsii oksigemoglobina.** [**Effects of carbophos and polychloropinene on the turnover of some trace elements and vitamins and on the rate of oxyhemoglobin dissociation.**] *Gig. Sanit.* 41(11): 97-99; 1976. (6 references) (Russian)

Trace element and ascorbic acid turnover, and the rate of dissociation of oxyhemoglobin were studied in rabbits treated with 1/10 LD50 doses of polychloropinene or 1/25 LD50 doses of carbophos p.o. for 45 days. Carbophos treatment caused significant increase in the copper concentration in the brain, kidneys and blood, of the ascorbic acid level in the brain and blood, and a decrease in the rate of dissociation of oxyhemoglobin. Polychloropinene caused significant increase in the ascorbic acid level of the blood, the reduction of the rate of oxyhemoglobin dissociation. The copper level of the tissues, the ascorbic acid level of the blood, and the dissociation rate of oxyhemoglobin were found to be the most sensitive indicators of the toxic effect of organochlorine and organochlorine pesticides.

77-1081. Konstantinova, T. K.; Efimenko, L. P.; Antonenko, T. A. (Sci. Res. Inst. Rural Hyg., Russian SSR Min. Pub. Health, Saratov, USSR). **Embriotropnoe deistvie produktov razlozheniia gerbitsidov na osnove 2,4-dikhlorfenoksiuksusnoi kisloty.** [**Embryotropic effects of herbicidal products based on 2,4-D.**] *Gig. Sanit.* 40(11): 102-105; 1975. (Russian)

The embryotropic action of 2,4-D (50, 1 and 0.1 mg/kg), 2,4-dichlorophenol (2,4-DP; 1 and 0.1 mg/kg), and of their combination (0.1 mg/kg each of 2,4-D and 2,4-DP) was studied in rats by administration through gastric tube. The animals received 2,4-D and its combination with 2,4-DP between days 7 and 14 of their pregnancies, and 2,4-DP was administered throughout the pregnancy. Neither 2,4-D, nor 2,4-DP, nor their combination caused embryonal mortality and maliformations in the doses used in the experiments. Increased number of fetuses with hemorrhages of the internal organs was found after the administration of 50 mg/kg doses of 2,4-D, or 1 mg/kg doses of 2,4-DP, and of 0.1 mg/kg doses of 2,4-D + 2,4-DP. The inhibition of oxidation and phosphorylation, which manifested themselves in the fetuses in the form of hemorrhages, can be explained with tissue hypoxia due primarily to the status of the vascular system.

77-1082. Naishtein, S. Ya.; Chegrinets, G. Ya.; Bezborod'ko, M. D.; Voronova, G. F.; Nikula, R. G.; Chernyshev, I. V. (A.N. Marzeev Sci. Res. Inst. Gen. Munic. Hyg., Kiev, USSR). **Materialy k ustanovleniyu predel'no dopustimoi kontsentratsii khlorampa v pochve.** [**Data for determining the maximum permissible concentration of chloramp in the soil.**] *Gig. Sanit.* 41(12): 18-22; 1976. (5 references) (Russian)

Soil levels of 0.05 mg/kg chloramp and below were found to have no toxic effect on vegetable crops. No toxic effects were observed in animals exposed to chloramp quantities in vegetable food products, air, or water which would correspond to this level in soil. Therefore the maximum permissible concentration of chloramp in soil should be established at this value.

77-1083. Popov, I. G.; Radchenko, N. D. (Inst. Nat., Acad. Med. Sci., Moscow, USSR). **Otsenka eksperimental'nykh dannykh teratogennykh svoistv postoronnikh dlya organizma veshestv pri ikh kombinirovannom vozdeistvii.** [**Assessment of experimental data on teratogenic properties of substances foreign to the body in combined action.**] *Gig. Sanit.* (12): 32-35; 1976. (2 references) (Russian)

The authors found that the comparative assessment of the results obtained both in isolated and combined use of several substances, having a harmful action on embryogenesis, should be carried out with due regards for the dose-effect dependence of investigated compounds and the correlation between embryonic mortality and the number of embryos with development anomalies.

77-1084. Zetterberg, G.; Busk, L.; Elovson, R.; Starec-Nordenhammar, I.; Ryttman, H. (Dep. Genet. Plant Breeding, Univ. Uppsala, Sweden). **The influence of pH on the effects of 2,4-D (2,4-dichlorophenoxyacetic acid, Na-salt) on *Saccharomyces cerevisiae* and *Salmonella typhimurium*.** *Heredity* 84: 254; 1976.

The genetic effects of 2,4-D have been investigated using cells of the yeast *Saccharomyces cerevisiae* and the bacterium *Salmonella typhimurium* in in vitro and in vivo experiments. In vitro experiments showed that the killing of both yeast and bacteria is dependent on the pH in the treatment solution of 2,4-D. A dose-dependent increase of the frequency of mitotic gene conversion and mitotic recombination in yeast was shown at pH 4.50 and pH 4.30. In in vitro experiments with two strains of *Salmonella* no significant increase of the number of revertants to prototrophy was obtained. The positive correlation between survival of cells and dissociation of 2,4-D in the pH-region 2.8-5.0 indicates that the cells are unable to take up dissociated 2,4-D and therefore the survival is high at a relatively high pH when most 2,4-D occurs in dissociated form and the survival is low at a relatively low pH when more of 2,4-D is in its undissociated form. No genetic effects were induced by oral administration of tolerable doses of 2,4-D in host-mediated assays using mice as hosts and yeast or *Salmonella* as indicator cells.

77-1085. Tabei, T.; Heinrichs, L. (Dep. Obstet. Gynecol., Univ. Washington Sch. Med., Seattle, WA). **Neonatal effect of clomiphene and *o,p'*-DDT on hepatic oxidative metabolism of male rats.** *Hormone Res.* 7(4-5): 227-231; 1976. (10 references)

The hepatic oxidative metabolism of dehydroepiandrosterone (DHA) and aminopyrine was reduced

in male rats treated neonatally with clomiphene and *o,p'*-DDT. Adult rats of both sexes were treated neonatally with either clomiphene citrate (100 μg on day) or *o,p'*-DDT (1 mg daily on days 2-3). The rates of 16α, 7α- and 7β-hydroxylase activities of DHA and the *N*-demethylase activities of aminopyrine in hepatic microsomes of normal males were significantly ($p<0.05$) higher than those of females. Treatment with clomiphene citrate reduced significantly ($p<0.05$) the 16α-hydroxylase activities of males and appeared to suppress the 7α-hydroxylase and *N*-demethylase activities to a lesser extent. Neonatal *o,p'*-DDT also reduced these hepatic oxidative activities. Neither treatment affected the 7β-hydroxylase activities. No significant differences in these activities were observed between the control and the treated females, all of which had persistent vaginal estrus. Therefore, it appears that treatment of male neonates with these weak estrogenic compounds antagonizes the androgen-mediated expression of the DHA-16α-hydroxylase activity in liver.

77-1086. Rossi, L.; Ravera, M.; Repetti, G.; Santi, L. (Ist. Oncol., Univ. Genova, Genoa, Italy). **Long-term administration of DDT or phenobarbital-Na in Wistar rats.** *Int. J. Cancer* 19(2): 179-185; 1977. (29 references)

Liver-cell tumors developed in outbred male and female Wistar rats given either technical DDT mixed in the diet at 500 ppm or phenobarbital-sodium dissolved in drinking water at 500 ppm. The incidence of liver tumors was 45% in the DDT-treated group and 44% in the phenobarbital-sodium-group. When evaluated by sex, DDT-treated females and males had incidences of 56% and 35½, respectively, while in the phenobarbital-sodium group, the respective incidences were 32% and 59% in females and males. These data show a varying susceptibility between the sexes with regard to induction of liver-cell tumors by the two compounds. In both treated groups, the number of nodular tumors per rat and the average size increased with age and were greater in females. None of these tumors had metastasized. Histologically, the liver tumors were nodular growths, which compressed surrounding parenchyma but did not infiltrate it. An apparent reduction of adrenal tumors were recorded in treated animals.

77-1087. Edery, H.; Grunfeld, Y. (Israel Inst. Biol. Res. Ness-Ziona, Israel). **Action of cholinolytics on soman-induced vasodepression.** *Isr. J. Med. Sci.* 21(10): 1229; 1976. (1 reference)

Soman and various drugs, including cholinolytic agents, were topically applied by means of a special cannula to the chemosensitive areas of the ventral medulla oblongata of anesthetized cats. Soman (2-5 μg) caused a marked and dose-dependent fall in the femoral artery blood pressure without concomitant alterations in heart rate or ECG changes. The blood cholinesterase activity decreased slightly during the period of decreased blood pressure. The vasodepressor response was not prevented by the i.v. injection of 2 mg/kg atropine methyl nitrate or atropine sulfate and benactyzine or 0.5 mg/kg diazepam, or by bilateral severance of the vagus nerve. However, application of 1 mg of these cholinolytics to the ventral medulla result in prompt restoration of the blood pressure. Variable respiratory changes also followed topical application of soman to the ventral medulla. In animals pretreated with 2 mg/kg i.v. cholinolytics, blood pressure was not affected by the topical application of up to 20 μg soman to the parietal cortex or trapezoid bodies or by frequently repeated i.v. injections of the pesticide (total dose 12 μg/kg). The data suggest the involvement of circumscribed cholinoceptive sites on the ventral medulla oblongata in the mechanism of centrally-induced soman vasodepresison.

77-1088. Subba-Rao, R. V.; Alexander, M. (Lab. Soil Microbiol., Dep. Agron., Cornell Univ., Ithaca, NY 14853). **Effect of chemical structure on the biodegradability of 1,1,1-trichloro-2,2-bis (*p*-chlorophenyl)ethane (DDT).** *J. Agric. Food Chem.* 25(2): 327-329; 1977. (12 references)

Thirty-seven analogues of 1,1,1-trichloro-2,2-bis (*p*-chlorophenyl) ethane (DDT) and its metabolites were tested for their susceptibility to biodegradation by means of the biological oxygen demand technique. Of the diphenylmethanes, benzhydrols, benzophenones, and phenylacetates tested, the unsubstituted chemicals and those with a single hydroxyl, amino, or methoxy group in the para position were readily metabolized by soil microorganisms. Chemicals with hydroxyl, chlorine, or methoxy groups in both para positions were resistant to biodegradation. (Author abstract reprinted by permission of the American Chemical Society)

77-1089. Iwata, Y.; Westlake, W. E.; Barkley, J. J.; Carman, G. E.; Gunther, F. A. (Dep. Entomol., Univ. California, Riverside, CA 92502). **Behavior of phenthoate (cidial) deposits and residues on and in grapefruits, lemons and lemon leaves, oranges and orange leaves, and in the soil beneath orange trees.** *J. Agric. Food Chem.* 25(2): 362-368; 1977. (12 references)

Phenthoate residues on and in orange rind dissipated rapidly during the 4-week period after spraying. The degradation half-life during the initial weathering period was about 14 days and the persistence half-life during the last 30 days of the study was about 50 days. Dissipation from lemon rind was qualitatively similar but slower than that on oranges while dissipation from grapefruit rind was faster. Low-volume application left more rind residues on oranges and lemons than the corresponding dilute application. Phenthoate residues above 0.01 ppm were not detected in the pulp of the three fruits. Little residue reduction occurred from laboratory washing of oranges and lemons but 50% was removed from 3-day posttreatment grapefruits. Dried orange pulp cattle feed contained up to 2.5 times more residue than the ground rind on a weight basis. The foliar dislodgeable residue level decreased from

1.7 (maximum) to 0.05 $\mu g/cm^2$ in 14 days for all three fruits. Field washing of trees effectively removed about 70% of the phenthoate dislodgeable residues on orange leaves at 3- and 10-days posttreatment while vigorous shaking of trees had no measurable effect on dislodgeable residues. At least 85% of the particulate matter dislodged during shaking was larger than would enter the human trachea. Phenthoate residues were quite persistent on dry soil. (Author abstract reprinted by permission of the American Chemical Society)

77-1090. Petrella, V. J.; McKinney, J. D.; Fox, J. P.; Webb, R. E. (Dep. Hum. Nutr. Foods, Virginia Polytech. Inst. State Univ., Blacksburg, VA 24061). **Identification of metabolites of endrin. Metabolism in endrin susceptible and resistant strains of pine mice.** *J. Agric. Food Chem.* 25(2): 393-398; 1977. (9 references)

Oral dosage of endrin resistant and susceptible pine mice with [^{14}C]endrin resulted in the production of one fecal (F-1) and up to the three urinary (U-1, U-2, and U-3) metabolites. A single product (L-1) was detected in in vitro metabolism of endrin by hepatic microsomes. Metabolites F-1, U-2, and L-1 were identified as *anti*-12-hydroxyendrin, a compound produced and excreted to a greater extent by the resistant as compared to the susceptible strain. Tentative structural assignments for U-1 and U-3 were necessitated because of limited sample availability. It is suggested that U-1 is one of four possible tertiary alcohols of endrin, and U-3 is one of two possible cyclic hemiketals. (Author abstract by permission)

77-1091. Hawkins, D. R.; Weston, K. T.; Chasseaud, L. F.; Franklin, E. R. (Dep. Metab. Pharmakokinetics, Huntington Res. Cent., Huntingdon PE18 6ES, England). **Fate of methoprene (isopropyl (2E, 4E)-11-methoxy- 3,7,11-trimethyl- 2,4-dodecadienoate) in rats.** *J. Agric. Food Chem.* 25(2): 398-403; 1977. (22 references)

The metabolic fate of methoprene, isopropyl (*E*,4*E*)-11-methoxy- 3,7,11-trimethyl- 2,4-dodecadienoate, a new insect growth regulator (Altosid), has been studied in rats. After oral administration of [5-^{14}C]methoprene, means of 19.6 and 18.0% of the dose were excreted in the urine and feces, respectively, during 5 days. During the same time, 38.8% was excreted in the expired air as $^{14}CO_2$ and, after 5 days, a mean of 17.2% was retained in the body. Most of the residual radioactivity was present in the fat (8.5% equivalents) and muscle (2.2%) and concentrations were highest in the liver (84.5 ppm), kidneys (29 ppm), lungs (26 ppm), and fat 36.5 ppm). Whole-body autoradiographs showed extensive distribution of radioactivity and particularly notable was the high concentration in the adrenal cortex. No methoprene was detected unchanged in bile or urine and about 12 radioactive components could be detected in urine, none of which corresponded to the authentic reference compounds, which would arise by simple ester hydrolysis and/or *O*-demethylation. The available evidence indicated that the metabolites probably arose from β-oxidation of methoprene. (Author abstract reprinted by permission of the American Chemical Society)

77-1092. Hubbell, J. P.; Casida, J. E. (Dep. Med. Biochem., Burroughs Wellcome Co., Research Triangle Park, NC 27709). **Metabolic fate of the *N,N*-dialkylcarbamoyl moiety of thiocarbamate herbicides in rats and corn.** *J. Agric. Food Chem.* 25(2): 404-413; 1977. (15 references)

A major metabolic pathway for EPTC and butylate in rats, accounting for at least 27-45% of the administered dose, is as follows: thiocarbamate - thiocarbamate sulfoxide - *S*-(*N,N*-dialkyl- carbamoyl) glutathione - *S*-(*N,N*-dialkylcarbamoyl) cysteine - *S*-(*N,N*-dialkylcarbamoyl) mercapturic acid, *S*-(*N,N*-dialkylcarbamoyl) mercaptoacetic acid, and *N*-[*S*-(*N,N*-dialkylcarbamoyl) mercaptoacetyl]glycine (from butylate only). *S*-(*N*-Isobutylcarbamoyl) mercapturic acid is also formed from butylate. These findings are based on identification and quantitation of the urinary metabolites from ^{14}CO-labeled preparations of the first four compounds in the metabolic sequence, in both the EPTC and butylate series. About 40% of the administered [^{14}CO]EPTC and [^{14}CO]butylate dose is metabolized by ester cleavage and $^{14}CO_2$ liberation without going through the thiocarbamate sulfoxide as an intermediate. Benthiocarb, cycloate, molinate, and pebulate also give the appropriate mercapturic acid derivatives in the urine. The roots and leaves of corn seedlings convert [^{14}CO]EPTC or its sulfoxide to the glutathione and cysteine conjugates and many other metabolties that are the same compounds in control plants and those treated with antidote, R-25788. (Author abstract by permission)

77-1093. Kapoor, I. P.; Blinn, R. C. (Agric. Div., Amer. Cyanamid Co., Princeton, NJ 08540). **Absorption, excretion, and metabolism of cyolane (phosfolan) systemic insecticide (diethoxyphosphinyl) dithioimidocarbonic acid, cyclic ethylene ester) in the rat.** *J. Agric. Food Chem.* 25(2): 413-417; 1977. (4 references)

When rats were given a single oral dose of [^{14}C]phosfolan (Cyolane, a registered trademark of American Cyanamid Co.) they excreted approximately 50% of the administered radioactivity and respired about 20% as $^{14}CO_2$ within 144 h. The radioactive residues in the various tissues were found to be distributed throughout the body with lower concentrations residing in fat and muscle. Chromatographic analysis of urinary and tissue radioactivity showed the presence of only one significant metabolite, which was identified as thiocyanate ion. (Author abstract reprinted by permission of the American Chemical Society)

77-1094. Hallett, D. J.; Greenhalgh, R.; Weinberger, P.; Prasad, R. (Chem. Control Res. Inst., Environment

Canada, Ottawa, Ontario, Canada). **The uptake and metabolism of fenitrothion by germinating white pine, white spruce and yellow birch seeds.** *J. Environ. Sci. Health* B12(1): 53-69; 1977. (24 references)

The seeds of white pine, white spruce and yellow birch were stratified in the presence of fenitrothion (40 μm) and then germinated. Fenitrothion was rapidly taken up by the conifer seeds during the first four days, whereas the uptake by birch reached a maximum after 14 days. Both fenitro-oxon and desmethyl fenitrothion were detected as primary metabolites; the levels of both were highest in birch, 11 and 37 ppm, respectively. *S*-Methyl glutathione was isolated from white pine seeds treated with labeled fenitrothion, indicating the presence of a glutathione mediated alkyl transferase system in the seeds, which is responsible for the formation of desmethyl fenitrothion. NMR experiments suggested that the secondary metabolite *S*-methyl fenitrothion results from the alkylation of desmethyl fenitrothion by excess fenithrothion. A correlation was suggested between the level of glutathione in the seed and the ability to survive heavy doses of fenitrothion.

77-1095. Reiter, L. (Health Effects Res. Lab., U.S. Environ. Protect. Agency, Research Triangle Park, NC 27711). **Behavioral toxicology: effects of early postnatal exposure to neurotoxins on development of locomotor activity in the rat.** *J. Occup. Med.* 19(3): 201-204; 1977. (7 references)

Lactating Sprague-Dawley rats were treated with 5% lead carbonate incorporated in the feed and later with 50 ppm lead acetate incorporated in the drinking water. Lactating Long-Evans rats were given 0-10 mg/kg/day mirex (dichlorane) by stomach tube. The treatments were begun at parturition and lasted for 4 (mirex) or 21 (lead) days. Lead administration produced an early hyperactivity in the offspring which disappeared as the animals matured. As adults, the lead-treated offspring showed an altered response to d-amphetamine indicating some persistent CNS dysfunction, however. Mirex treatment produced an increase in locomotor activity which was manifested only as the animal matured. The initial reactivity of untreated and Mirex-treated offspring to a novel environment (42 days of age) was the same, but the Mirex-treated animals required longer to acclimate to the environment. Once the treated animals became acclimated to the environment, spontaneous activity decreased to normal levels.

77-1096. Smolen, V. F.; Erb, R. J. (Dep. Ind. Phys. Pharm., Sch. Pharm. Pharm. Sci, Purdue Univ., West Lafayette, IN). **Predictive conversion of *in vitro* drug dissociation data into *in vivo* drug response *versus* time profiles exemplified for plasma levels of warfarin.** *J. Pharm. Sci.* 66(3): 2970304; 1977. (23 references)

A mathematical approach to computing the *in vivo* drug response profiles (such as plasma level, pharmacological response, and urinary recovery *versus* time curves) corresponding to observed *in vitro* dissolution of drug dosage form *versus* time profiles is described. The method is exemplified for warfarin tablets, for which observed *in vivo* plasma level profiles are compared to corresponding predicted profiles computed from *in vitro* dissolution data.

77-1097. Decloitre, F. (Inst. Rech. Sci. Cancer, CNRS, 8, F 94800 Villejuif, France). **Evaluation dans le foie de rat du risque genotoxique presente par un pesticide organophosphore: le parathion. [Studies on the genotoxic effects of parathion, an organophosphate pesticide, on the rat liver.]** *J. Physiol. (Paris)* 72(7): 79A; 1976. (French)

The oral administration of 6 ppm parathion for 7 or 14 days to the rat causes an interaction of the pesticide metabolites with proteins and nuclear DNA in the rat's liver. Although the residue concentrations are small, their fixation in protein and DNA macromolecules is evidence of a molecular alteration of DNA.

77-1098. Talanov, G. A.; Daurova, E. G.; Kuznetsov, V. D. (All-Union Sci. Res. Inst. Vet. Hyg., USSR). **Ostataki karbofosa v moloke korov pri peroral'nom postuplenii pestitsida. [Residues of carbophos in cow's milk after peroral pesticide administration.]** *Khim. Sel. Khoz.* 14(9): 73-74; 1976. (5 references) (Russian)

Milk from cows treated with various orally administered doses of carbophos was analyzed for carbophos (malathion) residues by thin-layer chromatographic and enzymatic methods at a sensitivity of 0.02-0.024 mg/liter. Grass taken from a grassland treated with a single carbophos dose of 3 kg/ha contained 280 mg/kg carbophos on the day of the treatment, 120 mg/kg on the first day after, and 50 mg/kg on the third. The milk of cows having ingested up to 4.2 g of carbophos in such forage in one day contained only traces of carbophos. Another group received carbophos mixed with the feed; they ingested doses of 6.25-16.6 mg/kg daily for 6 days. No traces of carbophos were found in the milk. A third group received carbophos emulsion in single doses of 16.6-25 mg/kg. Their milk contained 0.04-0.12 mg/l carbophos 12 hr after ingestion, and 0.04 mg/l 24 hr after ingestion of a 25 mg/kg dose, and only traces after 48 hr. No traces of carbophos were found in the milk 24 hr after poisoning with 16.6 mg/kg doses. The absence or low levels of carbophos residues in the milk after ingestion with feed are probably due to its degradation by the microflora in the forestomach.

77-1099. Borzsonyi, M.; Pinter, A.; Surjan, A.; Marta, C. (Author address not given). **Carbendazimbol *in vivo* keletkezett daganatkelto *N*-nitroso vegyulet transplacentaris hatasanak vizsgalata Swiss egereken. [The transplancental effect of carcinogenic *N*-nitroso compounds formed *in vivo* from carbendazim in Swiss mice.]** *Magy. Oncol.* 20(3): 163-171; 1976. (47 references) (Hungarian)

The offspring of pregnant mice treated with carbendazim and sodium nitrite developed malignant lymphomas. Inbred Swiss mice were treated in the first (Group

A), second (Group B) and third (Group C) week of their pregnancy, and through the whole pregnancy (Group D) by gavage with carbendazim, which has a fungicidal effect. Sodium nitrite was simultaneously added to their drinking water in 0.5 g/l concentration. The control animals received carbendazim and tap water (Group E), sodium nitrite only (Group F), and one group of animals obtained no treatment at all (G). The offspring of the carbendazim + sodium nitrite treated animals developed malignant lymphomas in 33.3% in the A, 38.8% in the B, and 70% in the D groups. The tumors were manifested in the 20-43 week old animals. In the cytoplasm of proliferating lymphoblasts the presence of A type, and in the intercellular spaces, C type oncorna viruses could be proved. No tumors could be found in the offspring of animals treated with carbendazim alone.

77-1100. Truchlinski, J. (Acad. Agric., Lublin, Poland). **Badania nad wplywem wybranych pestycydow fosforoorganicznych na funkcje komorek fibroblastow ludzkich w hodowli "in vitro". III. Badania nad dzialaniem folitionu i intrationu. [Effect of selected phosphoorganic pesticides on the *in vitro* function of human fibroblast cells. III. Action of folithion and intrathion.]** *Med. Dosw. Mikrobiol.* 28(3): 303-311; 1976. (4 references) (Polish)

A correlation was found between pesticide-induced cytopatholoyic effects on fibroblasts and the ability of the fibroblasts to assimilate glucose and alpha-amino N-containing compounds. Folithion (fenitrothion), a thiophosphoric acid derivative, and intrathion (thiometon), a dithiophosphoric acid derivative, were lested for their effect on the ability of human fibroblasts grown *in vitro* to assimilate glucose and alpha-amino N-containing compounds from the medium. Higher subtoxic doses of folithion (50 and 25 μg per ml of 199 medium) and intrathion (50, 25, and 12.5 μg per ml of 199 medium) inhibited the assimilation of the above compounds, while the process was stimulated by a dose of 6.25 μg/ml of both pesticides.

77-1101. Giermaziak, H.; Andrzewski, S. (Dep. Environ. Radiol. Toxicol., Inst. Med., Wojskow, Poland). **Wplyw ostrego zatrucia intrationem na aktywnosc niektorych hydrolaz osocza i granulocytow oraz liczbe i erythrocytow krwi obwodowej krolikow. [Effect of acute intration intoxication on the activity of some plasma hydrolases and granulocytes as well as on leukocyte and erythrocyte counts in rabbit peripheral blood.]** *Med. Pr.* 27(6): 417-424; 1976. (7 references) (Polish)

The effect of acute intration (thiometon) intoxication of rabbits on the activity of some lysosomal hydrolases and alkaline phosphatase in plasma and in homogenate fractions of leukocytes, as well as on selected elements of peripheral blood were measured before and after 2-PAM (pralidoxime) treatment. An increase of acid hydrolase activity and leukocyte count, and a decrease in erythrocyte count occurred in rats within 24 hours of treatment with 2-PAM. The increased enzyme activity is explained by the labilization of lysosomal membranes with hydrolase liberation to blood circulation. The increased blood leukocyte count is a reaction of the organism to intration, which also has a depressive effect on the bone marrow, causing a decrease of erythrocyte count. A single dose of 2-PAM administered in the acute phase of intoxication has a stabilizing effect on the lysosomal membranes, neutralizing the toxic compound.

77-1102. Franz, J. M.; Hassan, S. A.; Bogenschuetz, H. (Inst. Biol. Schaedlingsbekaempf., Biol. Bundesanst. Land- Forstwirtsch., Darmstadt, Germany). **Einige Ergebnisse bei der standardisierten Laboratoriumsprufung der Auswirkungen von Pflanzenschutzmitteln auf entomophage Nutzarthropen. [Some results of standardized laboratory tests on the effect of pesticides on entomophagous beneficial arthropods.]** *Nachrichtenbl. Dtsch. Pflanzenschutzdienstes (Braunschweig)* 28(12): 181-183; 1976. (11 references) (German)

Adults of two parasitic Hymenoptera (*Trichogramma cacoeciae* Marchal and *Coccygonimus turionella* (L.)) were exposed to fresh dry residues of pesticides, using a standard test method. The impact on pesticide industry and growers of the results obtained with 18 fungicides, 30 insecticides and acaricides as well as 5 herbicides is briefly discussed.

77-1103. Clark, M. A. (Dep. Biol., Univ. Texas at Arlington, Arlington, TX 76019). **Possible role for acetylcholine in aggregation centre spacing in *Polysphondylium violaceum*.** *Nature* 266(5598): 170-172; 1977. (14 references)

Plate cultures of the slime mold *Polysphondylium violaceum* exposed to the vapors of a pest strip containing DDVP (dichlorvos) showed a startling increase in the number of aggregation centers and sorocarps formed. The effect of exposure to the pesticide strip was most nearly duplicated by exposing postvegetative cells deposited on membrane filters to filter pads saturated with a solution of 3×10^{-1} M DDVP. Although filter-grown and plate-grown cultures of *Dictyostelium discoideum* showed no increase in center production on exposure to DDVP, aggregation in this species was partially inhibited or delayed on exposure to pesticide concentrations about 10^{-4} M. At noninhibitory concentrations of DDVP, the slug tip regressed at culmination, the sorogens became club-shaped, and slug migration was suppressed. Malathion both accelerated aggregation and increased the number of centers formed in submerged populations of *D. discoideum* Ax-2. The increased center production by *P. volaceum* in the presence of DDVP suggests that cholinesterase or another serine-esterase is instrumental in determining the size of the aggregation territory in this species. The DDVP effect appears to be at least in part a consequence of interference with a cholinergic mechanism.

77-1104. Wolthuis, O. L. (Med. Biol. Lab. TNO, Rijswijk, The Netherlands). **Spierstimulantia; een nieuwe therapie voor zenuwgasvergiftiging of slechts tijdwinst bij de behandeling? [Muscle stimulants: a new treatment for nerve gas poisoning or merely a gain of time in treatment?]** *Ned. Mil. Geneeskd. Tijdschr.* 29: 105-142; 1976. (7 references) (Dutch)

The use of muscle stimulants against nerve gas poisoning is discussed. If atropinized animals poisoned with lethal doses of nerve gases are kept alive with artificial respiration, in almost all cases sufficient spontaneous respiration takes over again after 2-12 hrs. In intoxicated animals, muscle stimulants transform the twitchlike contractions of striated muscles inadequate to maintain respiration into substained contractions of sufficient duration to keep respiration going until spontaneous respiration is recovered to the extent where it can take over again. Therapy with muscle stimulants in conjunction with atropine was shown to prevent the occurrence of respiratory paralysis by as high as 32 x LD_{50} sarin or paraoxon, compounds which cause a respiratory paralysis of a few hours. Against nerve gases such as soman and tabun, which cause a longer lasting paralysis of respiration, therapy with muscle stimulants in combination with atropine has not yet reached the point where respiratory failure is completely prevented. Against these nerve gases only a delay of a few hours of the occurrence of the respiratory paralysis has been achieved. Toxic side effects after repeated administration of the muscle stimulants interfered with a full therapeutic result. The nature and treatment of these side effects are currently being studied. A therapy based on muscle stimulants would have the advantage that it is independent of: 1) the type of nerve gas; 2) whether a nerve gas inhibits centrally (CNS) or peripherally (motor endplate) and 3) whether reactivation of the inhibited cholinesterase by oximes is feasible or not. Moreover, such a therapy could be easily administered by self-injection.

77-1105. Borzsonyi, M.; Pinter, A. (Natl. Inst. Hyg., Budapest, Hungary). **The carcinogenicity of *N*-nitroso compounds formed endogenously in mice from benzimidazole carbamate pesticides.** *Neoplasma* 24(1): 119-122; 1977. (17 references)

Malignant lymphomas developed in Swiss mice after intragastric treatment of drinking water with carbamate pesticides benomyl or carbendazim combined with sodium nitrite. The carcinogenic effect of *N*-nitroso compounds formed from carbamate pesticides in vivo is reviewed. These results indicate that, under appropriate conditions, commercially available pesticides may increase tumor frequency in mice.

77-1106. Somogyi, P.; Chubb, I. W. (Univ. Dep. Pharmacol., Oxford, England). **The recovery of acetylcholinesterase activity in the superior cervical ganglion of the rat following its inhibition by diisopropylphosphorofluoridate: a biochemical and cytochemical study.** *Neuroscience* 1(5): 412-421; 1976. (30 references)

Injection of diisopropylphosphorofluoridate (DFP) into rats results in a marked inhibition of the acetylcholinesterase activity of the superior cervical ganglia and associated nerve trunks. Recovery of enzyme activity in these two tissues was studied biochemically and cytochemically. Shortly after injection of the poison there is a rapid recovery of the acetylcholinesterase activity in the ganglia. This phase continues until about 16 hr post-injection, and then it stops. The activity remains at this level for a further 80 hr, then there is another, but slower, accumulation of enzyme activity. The acetylcholinesterase activity of the preganglionic nerve trunk does not begin to recover from the poison until at least 48 hr after its injection. It reaches normal levels by 200 hr. Analysis of the multiple molecular forms of acetylcholinesterase show that there are four major soluble forms and, chiefly, one membrane-bound form of the enzyme in the ganglion, that there is one soluble and one membrane-bound form in the nerve trunk, that there is no preferential loss of any of the observed forms in response to decentralization of the ganglia, and that there is no preferential recovery of any form after diisopropylphosphorofluoridate poisoning. The cytochemistry reveals that the initial recovery phase is due to synthesis of the enzyme by the ganglion cells since under our incubation conditions these are the only structures which contain the enzyme for the first 48 hr after injection. It is suggested that appreciably less of the acetylcholinesterase is derived from the nerve trunk then is lost upon decentralization of the ganglia; it appears that the nerve might regulate the amount of enzyme that the postganglionic cells can synthesize and store.

77-1107. Leutenegger, M.; Caron, J.; Couchot, J.; Gross, A.; Maes, B.; Enger, A.; Millart, H. (Hopital Robert Debre, C.H.U., F 51090 Reims Cedex, France). **Dosage piasmatique de l'*op*'DDD. Interet Clinique. [Serum levels of *o,p* -DDD. Clinical interest.]** *Nouv. Presse Med.* 6(7): 566; 1977. (French)

Serum analysis of three patients with Cushing's syndrome undergoing treatment with *o,p*7-DDD showed that the levels of *o,p*'-DDD (TDE) were high during treatment, progressively decreased after interruption of treatment, and remained detectable at very low levels by the 18th month. The decrease recurred in two patients 18 mo after interruption of treatment with collapsed *o,p*'-DDD levels. Determination of *o,p*'-DDD levels may be of significance in the physiopathologic interpretation of post-therapeutic remissions and in the prediction of recurrences.

77-1108. Anonymous. **Production of abnormal fatty acid metabolism in rats by feeding DDT.** *Nutr. Rev.* 35(2): 52-54; 1977. (10 references)

Skin symptoms of essential fatty acid deficiency (EFA) occurred in rats fed a chow diet containing 5 ppm

o,p'-DDT, although the chow diet contained more than adequate linoleate (1.8% of the diet). The ability to desaturate palmitate to palmitoleate and 8,11,14-eicosatrienoate to arachidonate was reduced by 50% in liver microsomes of the DDT-fed rats.

77-1109. Iwan, J.; Hoyer, G.-A.; Rosenberg, D.; Goller, D. (Schering AG Berlin-Bergkamen, Berlin, Germany). **Transformations of 4-chloro-*o*-toluidine in soil: generation of coupling products by one-electron oxidation.** *Pestic. Sci.* 12(4): 621-631; 1976. (28 references)

Four coupling products formed by one-electron oxidation of 4-chloro-*o*-toluidine were isolated from soil samples after 90 days of incubation with [^{14}C]chlordimeform (200 mg/kg). The metabolic compounds were identified as 4,4'-dichloro- 2,2'-dimethyl- azobenzene, 4-chloro-6- nitro-*o*-toluidine, *N*-(4-chloro-*o*-tolyl)-2-methyl-*p*-benzoquinone monoimine and 2-(4-chloro-*o*-toluidino)-*N*-(4-chloro-*o*-tolyl)-6-methyl-*p*-benzoquinone monoimine, respectively. Mechanisms of formation and possible significance of these substances as indicators for metabolic pathways to mineralization of aniline derivatives are discussed. The chlordimeform soil concentrations (70-100 mg/kg) necessary for the formation of the azobenzene and the benzoquinone monoimines are at least 10 times higher than those occurring after actual field application. (Author abstract by permission)

77-1110. Mueller, H.; Schuphan, W. (Bundesanst. Ernaehr., Inst. Qualitaetsforsch. Pflanz. Erzeugnisse, Geisenheim/Rhg., West Germany). **Ein Beitrag zum Einsatz des Wachstumsregulators Chlorcholinchlorid (CCC) im Gemuesebau 2. Mitt.: biochemische Untersuchungen zum Metabolismus des CCC bei Kohlrabi (*Brassica oleracea* var. gongylodes), Blumenkohl (*Brassica oleracea* var. botrytis) und Tomaten (*Lycopersicon esculentum*). [A contribution to the application of the plant-growth regulator chlorocholine chloride (CCC) in vegetable crops 2. Biochemical studies in metabolism of CCC in kohlrabi, cauliflower, and tomatoes.]** *Qual. Plant. Pl. Fd. Hum. Nutr.* 25(2): 171-186; 1975. (15 references) (German)

The rates of metabolic transformation of CCC by means of chlorocholine chloride (methyl-^{14}C) were very small in three vegetables studied (kohlrabi 1-6%, cauliflower 1-4%, tomatoes 1-2%). The probable first product of transformation, choline, is used in the biosynthesis of glycocolbetaine and of phosphatidylcholine (lecithin). Labelled salt of *S*-methyl-methionine sulphonium was traced in the 'bulbs' of kohlrabi in small amounts (cv. Ocean about 0,2% of the total activity), indicating a transfer of methyl-groups from CCC or its metabolite choline to methionine. High residues will result from application of recommended amounts of CCC to vegetables, providing that rainfall after application does not remove the chemical.

77-1111. Montgomery, M. R. (Pulm. Toxicol. Lab. Res. Serv., Vet. Admin. Hosp., Minneapolis, MN 55455). **Paraquat toxicity and pulmonary superoxide dismutase: an enzymic deficiency of lung microsomes.** *Res. Commun. Chem. Pathol. Pharmacol.* 16(1): 155-158; 1977. (5 references)

Paraquat stimulates the microsomal generation of superoxide radical, O_2, and hydrogen peroxide, H_2O_2. The detoxification of these two oxidants is accomplished by superoxide dismutase (SOD) and catalase, respectively. SOD activity could not be detected in lung microsomes but was found in microsomes of both kidney and liver. This deficiency may be involved in the pulmonary specificity of paraquat. (Author abstract by permission)

77-1112. Hollinger, M. A.; Chvapil, M. (Div. Surg. Biol., Univ. Arizona Med. Sch., Tucson, AZ 85721). **Effect of paraquat on rat lung prolyl hydroxylase.** *Res. Commun. Chem. Pathol. Pharmacol.* 16(1): 159-162; 1977. (16 references)

Acute administration of paraquat (25 mg/kg, I.P.) was found to significantly increase prolyl hydroxylase in rat lung 7 days following treatment. There was no change in total collagen at this time point. At 21 days following drug treatment, total collagen was significantly elevated while prolyl hydroxylase activity had returned to control level. (Author abstract by permission)

77-1113. Kupfer, D.; Bulger, W. H. (Worcester Found. Exp. Biol., Shrewsbury, MA). **Interaction of *o,p'*-DDT with the estrogen-binding protein (EBP) in human mammary and uterine tumors.** *Res. Commun. Chem. Pathol. Pharmacol.* 16(3): 451-461; 1977. (27 references)

The *in vitro* effects of *o,p'*-DDT on the binding of ^{3}H-estradiol-17β (^{3}h-E_2) to the high affinity estrogen-binding protein (EBP) in cytosol derived from human mammary and uterine tumors were examined. *o,p'*-DDT inhibited the binding of ^{3}H-E_2 to EBP in both breast and uterine tumors. Using Scatchard and Lineweaver-Burk plot analyses, the inhibition by *o,p'*-DDT of ^{3}H-E_2 binding to mammary tumors EDP appears to result from competition for the 8S moiety binding sites and not from deactivation of the binding sites. The *KI* for the inhibition by *o,p'*-DDT with E_2 binding was determined, yielding a value of 0.5 ± 0.1 μM. The possible relevance of these findings to human population exposed to DDT derivatives is discussed.

77-1114. Lambert, G.; Brodeur, J. (Dep. Pharmacol., Fac. Med., Univ. Montreal, Montreal, Canada). **Influence de certains inducteurs ou de certaines combinations d'inducteurs enzymatiques sur l'elimination des residus du DDT chez le rat. [Effects of enzyme inducers and combinations on excretion of DDT residues in the rat.]** *Rev. Can. Biol.* 35(1): 33-39; 1976. (19 references) (French)

The influence of pretreatments with various hepa-

tic microsomal enzyme inducers on the elimination of DDT residues was studied in rats previously contamined with *p,p'*-DDT at 5 mg/kg/day, during 20 days. The following inducers were used: phenobarbital (50 mg/kg/day, i.p.), 3,4-benzopyrene (20 mg/kg/day, s.c.) and norethandrolone (20 mg/kg/day, s.e.), all given during 14 consecutive days. Each inducer was administered singly or in combination with the other two according to a 2 x 2 x 2 factorial experiment. The animals were then sacrificed for the measurement of *p,p'*-DDT, *p,p'*-DDD and *p,p'*-DDE residues in the blood, brain, abdominal fat, liver and kidneys. The results show that phenobarbital lowers markedly the concentration of total residues in the fat tissue and brain and that norethandrolone brings about a reduction of the residues in the blood, brain and kidneys, but not in the fat tissue. On the other hand, 3,4-benzopyrene produces an increase of the residues in the brain, liver and kidneys. Phenobarbital thus appears to be more efficacious than the other two inducers in facilitating the elimination of DDT residues from the fat tissue. In addition, it appears that the elimination of DDT residues is not further accelerated by combining the inducers.

77-1115. Rozycka, D. (Inst. Legal Med., Cracow, Poland). **Badania nad toksycznoscia octanu fenylorteciowego. Czesc II. Wplyw octanu fenylorteciowego na obraz histologiczny watroby i nerki kurczat na niektore wasazniki stnau czynnosciowego watroby. [Studies on the toxicity of phenylmercuric acetate (PMA) in chickens. II. The effect of repeated administration of PMA on morphological changes in chicken kidney and liver and on the level of some serum enzymes.]** *Roczn. Panstw. Zakl. Hig.* 27(4): 379-386; 1976. (17 references) (Polish)

Morphological changes occurred in the kidney and liver of chickens treated every 48 hours with PMA (1 or 10 mg per kg of body weight) for periods of either 16 or 40 days. The degree of histological damage was relative to the amount and the number of PMA doses. The lower doses produced temporary damage. With higher doses of PMA, especially when given over longer periods the histological changes were more advanced, including necrosis of cells. The correlation between some serum enzymes and histologically detectable organ damage was examined. Irrespective of the degree of histological changes AspAT and AlAT values were within normal limits.

77-1116. Palut, D.; Grzymala, W.; Rozycki, Z. (No address given.) **Przemiany ustrojoew insektycydu enolofosforanowego (IPO063) u zwierzat laboratoryjnych. [Metabolism of an enolphosphate insecticide (IPO-63) in the organism of laboratory animals.]** *Roczn. Panstw. Zakl. Hig.* 27(4): 427-435; 1976. (11 references) (Polish)

The rate of IPO-63 degradation in rat liver was found to be determined by the age of the animals. The enzymatic breakdown of this experimental insecticide, *O*-(1-(2,4-dichlorophenyl-2- bromovinyl)-*O,O*-dimethyl phosphate labeled with ^{14}C was studied in the supernatant liver fraction of young and adult rats. Reduced glutathione served as a methyl group acceptor. Comparison was made to control determinations without addition of a cofactor. The degradation of the compound by cell preparations of young rats was twice as rapid in the presence of GSH (50.3%) as in tests without the addition of a cofactor (22.5%). On the other hand, in experiments carried out on adult rats no effect of cofactor was observed on the metabolism rate of the compound (in presence of GSH, 59.3%; without cofactor, 57.1%). The reduced IPO-63 biotransformation by cell preparations obtained from the livers of young rats was probably due to a low content of endogenous glutathione in the liver in the first stage of life and not to the activity of enzymatic systems. Chromatographic investigations and radiometric measurements demonstrated that under the described experimental conditions the main product of IPO-63 transformation in the rat liver is a demethylated derivative produced by splitting off one of the groups.

77-1117. Nikonorow, M.; Rozycka, D. (Dep. Food Anal. Nat. Inst. Hyg., Warsaw, Poland). **Badania nad toksycznoscia octanu fenylorteciowego. Czesc III. Poziom miedzi, cynku i kadmu w watrobie i nerce kurczat narazonych na dzialanie octanu fenylorteciowego. [Studies on toxicity of phenylmercuric acetate (PMA) in chickens. III. Studies on the levels of copper, zinc and cadmium in the liver and kidney of chickens exposed to repeated doses of PMA.]** *Roczn. Panstw Zakl. Hig.* 27(5): 569-575; 1976. (9 references) (Polish)

Mercury accumulated in chicken livers and kidneys in proportion to the amount of PMA administered. Chickens were fed commercial diet *ad libitum*. Doses of 1 or 10 mg PMA per kg of body weight were given into the crop every 48 hours during 16 and 40 day test periods. The livers and kidneys were mineralized and analyzed for total mercury by the dithizone method and for copper, zinc and cadmium by atomic absorption spectrometry. With 10 mg/kg for 40 days, the copper content of chicken organs decreased. In the same conditions the zinc content of the liver increased slightly, but no significant diference was noted. No differences were observed in the cadmium content of organs.

77-1118. Sulik, M.; Szymanski, A. (Dep. Anat. Patol., Inst. Biostruct., Acad. Med., Bialystok, Poland) **Badania morfologiczne i niektore odczyny histochemiczne w plucach szczurow po podostrym zatruciu foschlorem. [Morphological investigations and certain histochemical reactions in rat lungs after subacute foschlor poisoning.]** *Roczn. Panstw. Zakl. Hig.* 27(5): 587-592; 1976. (15 references) (Polish)

Foschlor administered to rats over 14 days in doses of 25 and 100 mg/kg caused significant morphological and histochemical changes in pulmonary vessels. The intensity of these changes depended not only on the dose used but also on the time expiring between the onset of exposure and the autopsy. Changes were more intense 30 days after

the last dose than immediately after intoxication. These results suggest a delay toxic action of foschlor, probably connected with an autoimmune response by the organism.

77-1119. Watanabe, I. (Fac. Agric., Iwate Univ., Morioka, Japan). **Pentachlorophenol-decomposing and PCP-tolerant bacteria in field soil treated with PCP.** *Soil Biol. Biochem.* 9(2): 99-103; 1977. (11 references)

Changes in microbial populations, especially PCP-decomposing and PCP-treatment organisms, were measured for three consecutive years in bacteria from field plots that had received annual applications of pentachlorophenol. Within 6 weeks after an initial application of PCP, PCP-decomposing microorganisms increased by about 3 orders of magnitude; this increased population was still observed the following spring. The number of PCP-decomposing microorganisms in the soils that received PCP for 3 yr reached 10^5/g soil or more, while that in soils without PCP was 10^2/g. . The soils that received PCP were not enriched with tetrachlorophenol-decomposing microorganisms. The microbes enriched by PCP may have been bacterial in nature. In 1972 and 1974, the number of PCP-tolerant bacteria increased immediately after PCP application and continued to increase for 2 weeks, then declined. The 1973 data, however, showed no such decline. The number of PCP-tolerant and of crystal violet-tolerant (Gram-negative) bacteria correlated fairly well except at 2 weeks after PCP application (when PCP-tolerant bacteria were more numerous).

77-1120. Gowda, T. K. S.; Rao, V. R.; Sethunathan, N. (Lab. Soil Microbiol., Cent. Res. Inst., Orissa, India). **Heterotrophic nitrification in the simulated oxidized zone of a flooded soil amended with benomyl.** *Soil Sci.* 123(3): 171-175; 1977. (9 references)

Applications of 5000 ppm of benomyl together with ammonium sulfate increased bacterial numbers in an alluvial soil. In a study on benomyl-soil microflora interactions in a simulated oxidized zone of a flooded soil, Nitrite was produced from ammonium in benomyl-amended soil, though in small amounts which disappeared later. Oxidation of nitrite to nitrate was not evident. No nitrite was detected in unamended soil. The predominant bacterium isolated from benomyl-amended soil, identified as a *Pseudomonas sp.*, oxidized the ammonium to nitrite in a medium containing glucose. Oxidation of ammonium to nitrite occurred in benomyl-amended soil as well as in bacterial cultures even in the presence of *N*-serve or AM at concentrations known to inhibit autotrophic nitrification. At the same time, benomyl even at the 100 ppm level inhibited nitrification by *Nitrosomonas* and *Nitrobacter.*

77-1121. Berteau, P.; Biermann, A. H. (Univ. California Sch. Publ. Health, Naval Biosci. Lab., Naval Supply Cent., Oakland, CA 94625) **Respiratory deposition and early distribution of inhaled vegetable oil aerosols in mice and rats.** *Toxicol. Appl. Pharmacol.* 39(2): 177-183; 1977. (14 references)

As part of a study on inhalation exposure of pesticide applications female mice or rats were exposed to small-particle aerosols (mass median diameter 2.1 μm) of vegetable oil containing an inert radio-labeled tracer. The level of radioactivity in the exposure chamber was monitored, and the amounts inhaled were determined from estimates of average respiratory minute volumes of the animals and the duration of exposure. By counting the radioactivity in head, lung, trachea, esophagus, stomach and duodenum, the deposition and early distribution in these organs were calculated. Of the calculated amount inhaled, the percentage found following whole-body exposure of mice was: head, 9.1%; lungs, 3.8%; stomach, 59%; esophagus, 4.7%, and duodenum, 7.0%. Comparable figures for rats were: head, 3.1%; lung, 9.9%; stomach, 13%; esophagus, 0.4%, and duodenum, 1.9%. The amounts in the trachea were generally negligible in both species. (Author abstract by permission)

77-1122. Desaiah, D.; Ho, I. K.; Mehendale, H. M. (Dep. Pharmacol. Toxicol., Univ. Mississippi Med. Ctr., Jackson, MS 39216). **Effects of kepone and mirex on mitochondrial Mg^{2+}-ATPase activity in rat liver.** *Toxicol. Appl. Pharmacol.* 39(2): 219-228; 1977. (34 references)

Effects of Kepone (chlordecone) and Mirex (dechlorase) on the hepatic mitochondrial Mg^{2+} ATPase (MATPase) activity was determined *in vitro* using mitochondrial preparations from male rats. In addition, the effect of preexposure of animals to Kepone on MATPase activity was also investigated. Kepone added to the mitochondrial preparations *in vitro* was an efficacious inhibitor of MATPase activity. Results of the kinetic experiments indicate that Kepone inhibits MATPase in a noncompetitive manner. DNA (10 μM)-stimulated MATPase activity was totally abolished by μM Kepone and, at higher concentrations (10 μM) native MATPase activity was also inhibited (95%). Mirex was without any discernible effect on MATPase activity up 20 μM concentration. Preexposure of animals to 50, 100, and 150 ppm Kepone in the diet for 16 days resulted in a 40% demonstrable decrease in MATPase activity, indicating that Kepone interferes with energy metabolism *in vivo*. The marked sensitivity of MATPase to Kepone is suggestive of the potential for Kepone to interfere markedly with various energy requiring processes in the body. (Author abstract by permission)

77-1123. Pickering C. E.; Pickering, R. G. (Shell Res. Ltd., Tunstall Lab., Sittingbourne Res. Ctr., Sittingbourne, Kent, England). **The interference by erythrocyte "acetylthiocholinesterase" in the estimation of the blood cholinesterase activity of the chicken.** *Toxicol. Appl. Pharmacol.* 39(2): 229-237; 1977. (9 references)

In deducing possible exposure of chickens to organophosphorus compounds from the measurement of blood cholinesterase activity, it is preferable to use plasma

separated from the whole blood rather than the whole blood. Whole blood must not be used in methods which involve hemolysis and use acetylthiochline as substrate. This is because there is acetylthiocholinesterase but not acetylcholinesterase activity within the chicken erythrocytes. When only small samples of unhemolyzed whole blood are available (e.g., under field conditions), it is possible to measure plasma cholinesterase activity by the Voss and Sachsse method, which avoids hemolysis, but does use acetylthiocholine as substrate. (Author abstract by permission)

77-1124. Renner, G.; Schuert, K. P. (Pharmacol. Inst., Univ. Munich, 8000 Muenchen 2, Germany). **2,4,5-Trichlorophenol, a new urinary metabolite of hexachlorobenzene.** *Toxicol. Appl. Pharmacol.* 39(2): 355-356; 1977. (5 references)

This study shows that 2,4,5-trichlorophenol (TCP) is a urinary metabolite of hexachlorobenzene (HCB). TCP could be isolated by TLC from urine of rats fed HCB. It was identified by the *Rf* value, uv absorbance, mp, mixed mp, ir-, nmr-, and mass spectroscopy and as its methyl ether, synthetized by the reaction of TCP with diazomethane. (Author abstract by permission)

77-1125. Vainio, H.; Parkki, M. G. (Dep. Physiol., Univ. Turku, Turku, Finland). **Enhancement of microsomal monooxygenase, epoxide hydrase and UDP-glucuronyltransferase by aldrin, dieldrin and isosafrole administrations in rat liver.** *Toxicology* 5(3): 279-286; 1976. (29 references)

Intraperitoneal administration of aldrin (10 mg/kg), dieldrin (10 mg/kg) and isosafrole (50 mg/kg) was found to enhance the activities of microsomal monooxygenase (e.g. *p*-nitroanisole *O*-demethylase, aryl hydrocarbon hydroxylase), epoxide hydrase (styrene oxide as substrate) and UDP-glucuronyltransferase (*p*-nitrophenol as aglycone). Dieldrin, the epoxidized derivative of aldrin, was a more potent inducer than the parent compound itself. NADPH cytochrome *c* reductase activity was enhanced 2.5-fold, *p*-nitroanisole *O*-demethylase 7-fold, benzpyrene hydroxylase 2-fold, and epoxide hydrase 5-fold after treating rats with dieldrin for 6 days. The increase in activity of the microsomal UDP-glucuronyltransferase could only be detected after an in vitro digitonin treatment of microsomal membranes, the enhancement being about 1.5-fold after administering dieldrin for 6 days. Isosafrole increased *p*-nitroanisole *O*-demethylase activity in rat liver microsomes 10-fold in 3 days. NADPH cytochrome *c* reductase activity was increased 2-fold, cytochrome P-450 content 1.2-fold, benzpyrene hydroxylase activity 2.5-fold and epoxide hydrase activity 1.2-fold after treatment of rats for 3 days. UDP-glucuronyltransferase activity increased 2.2-fold by treating rats for 6 days with isosafrole. This increase was, however, only to be seen in in vitro digitonin-activated microsomes due to the latency of UDP-glucuronyltransferase.

77-1126. Strange, J. R.; Kerr, W. E. (Sch. Biol., Georgia Inst. Technol., Atlanta, GA). **Teratogenic and toxicological examination of 2,4,5-trichlorophenoxyacetic acid in developing chick embryos.** *Toxicology* 6(1): 35-40; 1976. (12 references)

No teratological or developmental anomalies were found in chicken embryos injected with the herbicide 2,4,5-T. Practical grade 2,4,5-trichlorophenoxyacetic acid (2,4,5-T), dissolved in dimethylsulfoxide (DMSO), was injected into the air space of fertilized chicken eggs prior to incubation. Doses of 2,4,5-T were 12.5, 25, 50, 75, 100, and 125 mg/kg; toxicity on the first day of incubation was determined. A similar group was studied on day 5 of incubation with doses of 2,4,5-T at 50, 75, 100 and 250 mg/kg. LD_{50} was estimated to be 62 mg/kg on day zero and 68 mg/kg on day 5. Additionally, embryos were exposed to 2,4,5-T at 50 mg/kg on day zero of gestation and sacrified after 48 hr of incubation.

77-1127. Hartke, G. T.; Oehme, F. W.; Leipold, H. W.; Kruckenberg, S. M. (Dep. Pathol., Coll. Vet. Med., Kansas State Univ., Manhattan, KS). **Embryonic susceptibility of *Microtus ochrogaster* (common prairie vole) to phenyl mercuric acetate.** *Toxicology* 6(3): 281-287; 1976. (19 references)

Phenyl mercuric acetate (PMA) had a dose-dependent embryo-resorption effect when administered to pregnant rats. Pregnant *M. ochrogaster* received single intraperitoneal (i.p.) doses of 0.06, 0.125, 0.25, 0.5, 1, 2, or 5 mg phenyl mercuric acetate (PMA)/kg on day 7, 8, 9, 10, 11, or 12 of gestation. No toxicity was exhibited, and no abnormal fetuses were observed in any group. An embryocidal effect that dependend on dose and stage of development was determined by increased numbers of resorption sites; resorption sites were dose-dependent, and the embryocidal effect decreased as the embryo matured. A dose of 0.06 mg PMA/kg of body weight produced no resorptions when given on day 8 or day 10 of gestation; 0.125 mg/kg or 0.25 mg/kg produced no resorptions if given on day 10; 0.5 mg/kg resulted in live fetuses and resorptions in the same uterus when given on days 7 through 11; the same dose on day 12 produced all live fetuses; and 1, 2, or 5 mg PMA/kg given on day 8, 9, or 10 of gestation caused total embryo resorption.

77-1128. Byczkowski, J. Z. (Dep. Pharmacol. Inst. Pathol., Med. Sch., Gdansk, Poland). **The mode of action of *p,p'*-DDT on mammalian mitochondria.** *Toxicology* 6(3): 309-314; 1976. (21 references)

A time- and dose-dependent decrease in oxidative phosphorylation efficiency was found in rats treated with single, sublethal doses of *p,p'*-DDT. Oxidative phosphorylation efficiency, respiratory activity and "latent" ATPase activity in liver and brain mitochondria was determined. Time-dependent suppression of respiratory activity in state 3 was noticed and a stimulation of mitochondrial ATPase activity 24 hr after DDT treatment in liver and

brain mitochondria was found. The correlation between time-dependent changes in the brain mitochondrial fraction and distribution of DDT in brain after a single, oral dose is discussed. Changes in mitochondria were caused by DDT and its metabolites. The uncoupling of oxidative phosphorylation, especially in brain mitochondria, could be responsible for some DDT intoxication symptoms in mammals.

77-1129. Reuber, M. D. (11014 Swansfield Rd., Columbia, MD 21044). **Histopathology of carcinomas of the liver in mice ingesting dieldrin or aldrin.** *Tumori* 62(5): 463-472; 1976. (23 references)

Male and female C3HeB/Fe mice were given 10 ppm aldrin or dieldrin in the diet beginning at 3 wk of age and continuing for periods up to 24 mon. Carcinomas of the liver were detected in 87% of male and female mice given dieldrin, 82% of male mice given aldrin, and 80% of female mice given aldrin. Similar tumors appeared in only 30% of untreated males and 4% of untreated females. The tumors in the pesticide-treated animals were generally larger than those in the untreated animals and were often multiple instead of single as in the untreated mice. Some of the mice also had hyperplastic nodules in the liver. Metastases to the lung were found in three aldrin-treated males and three dieldrin-treated females. The tumors were well-differentiated to poorly-differentiated hepatocellular or cholangiocellular carcinomas, and the characteristics of the primary carcinoma were retained in metastases to the lungs. Hemangioendothelial sarcomas, leiomyosarcomas, and reticulum cell sarcomas were rarely observed in animals with hepatic carcinomas.

77-1130. Khaikina, B. I.; Shilina, V. F.; Ivanitsky, V. A. (All-Union Sci. Res. Inst. Hyg. Toxicol. Pestic Kiev, USSR). **Osobennosti obmena biogennykh aminov u teplokrovnykh pri vozdeistvii pestitsidami razlichnoi khimicheskoi prirody. [Biogenic amine metabolism in warm-blooded animals under the effect of pesticides of different chemical nature.]** *Vopr. Pitan.* (3): 47-50; 1976. (13 references) (Russian)

Lindane and ziram administered to rats and guinea pigs affected the urinary elimination of the principal serotonin metabolite, 5-hydroxylindoleacetic acid. A short-term (2 day) introduction to rats of large doses (34 mg/kg) of lindane and a protracted (90 day) action of low doses (1.7 mg/kg) produce changes in the content of serotonin and of 5-hydroxyindoleacetic acid in the brain, liver and kidneys. In the blood of guinea pigs receiving small amounts (4 mg/kg) of ziram for 120 days, shifts in the histamine histaminase histaminopexy system were found, indicating sensitization due to the pesticide.

77-1131. Kuzminskaya, U. A.; Bersan, L. V.; Girenko, D. B. (All-Union Sci. Res. Inst. Hyg. Toxicol. Pestic. Polym. Plastics, Kiev, USSR). **Kharakter raspredeleniya gamma-geksakhlortsiklogeksana v subkletochnykh fraktsiyakh pecheni i mozga. [The character of the gamma-hexachlorocyclohexane distribution in the subcellular fractions of the liver and brain.]** *Vopr. Pitan.* (5): 57-61; 1976. (18 references) (Russian)

Experiments with rats demonstrated that γ-HCCH (lindane) penetrates the cells of the liver and brain and is non-uniformly distributed among subcellular fractions (nuclear mitochondrial and supernatant). The character of the γ-HCCH distribution in the subcellular fractions of the liver and brain of albino rats with peroral threefold introduction of the compound in doses of 34 mg/kg (1/5 LD_{50}) and in a dose of 1.7 mg/kg (1/100 LD_{50}) for a space of 1, 3 and 6 months was investigated. Both in acute and chronic experiments the greatest amounts of the preparation were found in the nuclear fraction of the cell. The established features distinguishing the accumulation and distribution of the preparation in the subcellular fractions of the liver and brain explain the previously elicited biochemical and physiological shifts occurring in the organism after entrance of γ-HCCH thereinto.

77-1132. Shtenberg, A. I.; Mametkuliev, Ch. (Author address not given). **K voprosu o vliyanii gamma-izomera GKhTsG na funktsional'noe sostoyanie polov'ikh zhelz krys. [The effect of gamma-isomer of hexachlorocyclohexane (HCCH) on the state of sexual glands in rats.]** *Vopr. Pitan.* (4): 62-67; 1976. (5 references) (Russian)

Administration of the reduced HCCH gamma-isomer (lindane) in a dose of 5 mg/kg body weight reduced the pregnancy index when test female rats were mated with test males. This indicator as well as the mating index were down in a group of control males mated with test females. Among the offspring of test females sacrificed before and during gestation, a significant lagging of the weight gain at the end of the nursing period was recorded. Animals receiving the HCCH gamma-isomer in a dose of 0.05 mg/kg body weight did not differ from the control rats in any of the indicators measured.

77-1133. Frey, F. (Inst. Pflanzenkr. Rheinischen Friedrich-Wilhelms-Univ., Bonn, RFG). **Untersuchungen ueber die Wirkungen von im Obstbau verwendeten Herbiziden auf den Testnematoden *Acrobeloides buetschlii* (de Man, 1884) Steiner und Buhrer, 1933. [Effects of herbicides applied in orchards on *Acrobeloides buetschlii* (de Man, 1884) Steiner and Buhrer, 1933.]** *Z. Pflanzenkr. Pflanzenschutz 83(7/8): 434-441; 1976. (24 references) (German)*

Only paraquat, diquat and the nematicide Nemacur P showed effects on the nematode *Acrobeloides buetschlii* in water after 48 hr. Nematodes cultivated on nutrient-agar with bacteria for ten days declined if certain herbicide concentrations of diquat - paraquat - diuron - monolinuron - buturon - aminotriazole (amitrole) - 2,4-D - linuron and dichlobenil were given. The nematicide Nemacur P had a similar effect. In lower concentrations the nematodes increased if the herbicides aminotriazole - diuron - buturon -

dichlobenil - paraquat - diquat - 2,4-D and 2,4,5-T were added. No distinct effects were caused by the herbicides simazine - atrazine - neburon and MCPA. From 300 ppm upwards aminotriazole caused various malformations of the nematodes.

77-1134. Manciulea, S.; Giurgea, R. (Biol. Forschungszent., Cluj, Romania). **Einfluss kleiner Insektiziddosen auf die Leber von Kueken.** [**Effect of small doses of insecticide on the liver of chicks.**] *Zbl. Vet. Med. A* 22(8): 671-677; 1976. (16 references) (German)

Small doses of fenchlorphos and heptachlor affected RNA, DNA, amino acids, and total proteins in the liver of chickens. From the third week after hatching, chicks were exposed to 1 ppm fenchlorphos, 0.5 ppm fenchlorphos, or 1 ppm heptachlor for 4 or 8 weeks. Amino acids, ribonucleic acids and desoxyribonucleic acids rose in general. The heptachlor group was an exception; the RNA fell after 8 weeks and the DNA after 4 weeks, compared with the controls. The activities of GPT and GOT fell significantly irrespective of the length of exposure or the particular insecticide. An exception was GPT In the 1 ppm fenchlorphos group, where the activity increased. Total liver proteins rose in all groups after 4 weeks and fell after 8 weeks. Amino-N fell in all groups independently of the duration of exposure, except in the heptachlor group where there was a significant rise after 4 weeks' exposure.

See also **77-0970** **77-1019** **77-1020** **77-1021** **77-1026** **77-1038** **77-1061**

77-1135. Golovleva, L. A.; Finkel'shtein, Z. I.; Krupianko, V. I. (Inst. Biochem. Physiol. Microorg., USSR Acad. Sci., Pushchino, Moscow Oblast, USSR). **Opredelenie ordrama v vodnykh rastvorakh. [Determination of molinate in aqueous solutions.]** *Agrokhimiia* (11): 124-127; 1976. (8 references) (Russian)

Two methods for the determination of molinate in aqueous solutions are described. After threefold extraction with benzene, semiquantitative routine determination is by a TLC method, using silufol plates and hexane-diethyl ether (5:1) as a solvent system. After the plate is dried, it is sprayed with palladium chloride. The molinate appears in the form of yellow spots; the Rf value is 0.42±0.3. For exact quantitative determination, the benzene extract is combined with palladium chloride solution, and the optical density is measured UV spectrophotometrically. The recovery rate is 101-120% with the chromatographic method, and 9400% with the spectrophotometric method.

77-1136. Horton, G. L.; Lowe, J. R.; Lieske, C. N. (Biomed. Lab., Edgewood Arsenal, APG, MD). **Cholinesterase inhibition studies by stopped-flow instrumentation and automated data processing.** *Anal. Biochem.* 78(1): 213-228; 1977. (18 references)

An automated system was used to determine the inhibition constants for a combination of three inhibitors, paraoxon, amiton, and carbaryl, and two acetylcholinesterases, bovine erythrocyte and eel. The system uses stopped-flow techniques and automated data acquisition and processing to conduct studies on cholinesterase kinetics (including inhibition experiments) for the evaluation of the binding constant, Kd, the first-order inhibition constant, k_2, and the overall second-order inhibition constant, k_1. The instrumentation, hardware, and software have been developed and combined such that no training in computer languages and only a limited knowledge of computer systems interaction is necessary for its use. Application of the system to kinetic investigations requires no manual data gathering and manipulation.

77-1137. Ramstad, T.; Mahle, N. H.; Matalon, R. (Anal. Labs., Dow Chem. U.S.A., Midland, MI). **Automated cleanup of herbicides by adsorption chromatography for the determination of 2,3,7,8-tetrachlorodibenzo- *p*-dioxin.** *Anal. Chem.* 49(3): 386-390; 1977. (19 references)

An automated chromatographic system for separating and collecting trace levels of 2,3,7,8-tetrachlorodibenzo- *p*-dioxin (TCDD) from esters of 2,4,5-trichloro- phenoxyacetic acid (2,4,5-T) in commercial herbicide preparations was demonstrated. Previously, chemical cleanup by column adsorption chromatography required a newly-packed column for each sample. This system makes repeated use of a low-cost silica column for chemical cleanup. More than 400 runs have been achieved on a single column to date. System accuracy, as determined by checking against identical samples manually prepared, is excellent. The standard deviation for the same ester, analyzed 36 times, was 0.002 ppm at an average TCDD concentration of 0.026 ppm. There is no measurable sample to sample cross-contamination.

77-1138. Bess, R. C.; Irgolic, K. J.; Flannery, J. E.; Ridgway, T. H. (Dep. Chem., Texas A & M Univ., College Station, TX 77843). **Polarographic reduction of alkylarsonic and dialkylarsinic acids.** *Anal. Lett.* 9(12): 1091-1097; 1976. (12 references)

The polarographic reduction of the alkylarsonic acids (methyl, ethyl, propyl, butyl, pentyl, hexyl, heptyl, and octyl homologs) and the dialkylarsinic acids (ethyl, propyl, butyl, and cyclohexyl homologs) by differential pulse polarography is described. The HCl-KCl buffer solutions used had ionic strength of 0.1 M and pH of less than 2. A surfactant had to be added to minimize adsorption. Detection limits ranged from 0.11 to 88 ppm.

77-1139. Magallona, E. D.; Gunther, F. A. (Dep. Entomol., Univ. of the Philippines, College, Laguna, Philippines). **Gas chromatographic evaluation of some *N*-derivatives of intact carbaryl.** *Arch. Environ. Contam. Toxicol.* 5(2): 185-190; 1977. (5 references)

Gas chromatographic (GLC) detection of aryl *N*-methylcarbamates as the N-acetyl-Cl(x) or *N*-nitroso derivatives of the intact molecule was explored using carbaryl as the model compound. These derivatives were designed for use with the microcoulometric detector for chlorine and the solution conductivity detector for nitrogen but reponse to the electron capture detector was also studied. GLC characteristics of the derivatives were evaluated in terms of thermal stability and detector response. *N*-Trichloroacetyl and *N*-nitroso carbaryl underwent extensive decomposition in the GLC system. Although the *N*-monochloroacetyl derivatives were also subject to thermal decomposition, they gave sufficient linearity and sensitivity with the microcoulometric detector for analysis at the residue level. *N*-Acetyl carbaryl was thermally stable and the response of electrolytic conductivity and the electron capture detectors were adequate for residue analysis.

77-1140. Atallah, Y. H.; Whitacre, D. M.; Polen, P. B. (Velsicol Chem. Corp., Chicago, IL 60611). **Artifacts in monitoring-related analysis of human adipose tissue for some organochlorine pesticides.** *Chemosphere* 6(1): 17-20; 1977. (6 references)

Forty-three post-mortem human adipose tissue samples were analyzed by several techniques and quantitated by electron-capture gas-liquid chromatography (EC-GLC). Analytical Method A represented the complete routine method for residue analysis of human adipose tissue samples prescribed by EPA, Method B quantitated the results of derivatization through potassium tert-butoxide in tert-butanol for 2 hr at room temperature,

Method C provided additional cleanup to separate compounds of differing polarity, and Method D provided "screening" out of some "masqueraders" by thin-layer chromatographic cleanup. The results indicated the routine monitoring-related analysis of human tissue for organochlorine residues does not provide adequate selectivity to correctly quantitate residues of oxychlordane, heptachlor epoxide, and trans-nonachlor. Several "masqueraders", which are likely to occur in human adipose tissue, exhibited similar EC-GLC retention time characteristics which, in the absence of adequate safeguards, partially or totally invalidate the estimation of these three residues. It may therefore be necessary to refine the protocols of the human monitoring project to permit the collection of substantially valid data for the three compounds in question.

77-1141. Stijve, T.; Brand, E. (Control Lab., Nestle Products, La Tour-de-Peilz, Switzerland). **A rapid, low cost, small-scale clean-up method for the determination of organochlorine pesticide residues in fats and oils.** *Deutsche Lebensmittel-Rundschau* 73(2): 41-42; 1977.

A clean-up method for the determination of organochlorine pesticide residues in fats and oils is described which can be modified for use with small quantities of adsorbents and solvents. One hundred mg of the sample is cleaned up over a chromatography column containing 3 g of standardized Florisil. The pesticides are eluted with 30 ml of light petroleum-methylene chloride (4:1 v/v) and the eluate is concentrated to a suitable volume prior to analysis by electorn-capture gas-liquid chromatography. Recoveries of organochlorine pesticides added to various fats and oils ranged from 80 to 110% and comparative analyses using this procedure and generally applied large-scale procedures yielded essentially the same results. In addition to being rapid and reliable, the small-scale cleanup procedure requires only 1/10 to the quantity of chemical reagents required by large-scale methods.

77-1142. Tewari, S. N.; Sharma, I. C. (Toxicol. Div., Chem. Examiner's Lab., Agra, India). **New colour test for the detection of endrin in autopsy tissues.** *Fresenius Z. Anal. Chem.* 283(1): 32; 1977. (1 reference)

A new and specific color reaction for endrin has been worked out. It has been applied to tissues of poisoning cases and detected up to 0.05 mg of endrin per 100 g of tissue. The insecticide is extracted from the tissue and the solvent removed from the acetone solution obtained using a hot water bath. After cooling 20 ml of chilled nitrating mixture is added. The mixture is placed for 30 min in tap water, transferred to a boiling water bath, removed after 2 hr, and cooled in an ice bath. Then ice water is added, the mixture extracted with chloroform and evaporated to dryness. The residue is dissolved in 1-2 drops of cyclohexane, one drop of ethanolic *N* KOH solution is added and the change of color observed (suitably on a spotting tile). In presence of endrin a prominent violet color is immediately obtained, persisting for about 10 min and then changing to brown followed by yellow. Colors are also formed with other chlorinated insecticides: BHC blue; DDT transient violet-blue; aldrin and dieldrin brown; chlordane, toxaphene and kelthan (dicofol)e yellow.

77-1143. Mil'china, M. G.; Pertsovskii, A. L.; Prismotrov, Iu. A. (Belorussian Sci. Res Inst. Sanit. Hyg., Minsk, USSR). **Gazokhromatograficheskoe opredelenie mikrokolichestv 2,4-D. [GLC determination of 2,4-D traces.]** *Gig. Sanit.* 41(8): 72-75; 1976. (4 references) (Russian)

A gas chromatographic method for the determination of trace quantities of 2,4-D in soil, water, and in plant and animal tissues is described. Extraction with sulfated ether is followed by dealkylation of 2,4-D to 2,4-dichlorophenol with pyridine in hydrochloric acid at 300-200°C for 5 minutes, and by extraction of the 2,4-dichlorophenol with water-toluene (20:1). Determination is done on a gas chromatograph with electron capture detector. The sensitivity of the method amounts to 0.01 mg/l in water, to 0.01 mg/kg in soil, and to 0.05-0.1 mg/kg in plant and animal tissues.

77-1144. Stepanchenko, N. G. (Kiev Scientific Research Institute of Industrial Hygiene and Occupational Diseases, Kiev, USSR). **Opredelenie asulama v vozdukhe metodom khromatografii v tonkom sloe. [TLC determination of asulam in air.]** *Gig. Sanit.* 41(11): 82-84; 1976. (2 references) (Russian)

A thin-layer chromatographic method for the determination of Asulam (methyl-*N*- (4-aminobenzosulfonyl) carbamate) in air is described. Air is sampled through an AFA-KhA-18 filter at a flow rate of 1 l/min., after which the pesticide is extracted twice with methanol. Chromatographic determination is done on an alumina plate, using ethanol-water (2:1), ethanol-water-carbon tetrachloride (10:3:1.5), or ethanol-water-ethyl acetate (10:3:1.5) as a solvent system. After development, the plate is dried at 125°C for 20 min., after which the spots are visualized with 1% *p*-dimethylaminobenzaldehyde solution in 40% acetic acid, giving yellow spots, or with α-naphthol by the azo conjugation reaction, which generated red spots. The minimal detectable quantity is μg. The recovery rate is 79±1.7%.

77-1145. Chiba, M. (Res. Stn., Agric. Canada, Vineland Stn., Ontario LOR 2EO, Canada). **A rapid spectrophotometric method for the simultaneous determination of intact benomyl and its degradation product, methyl 2-benzimidazolecarbamate (MBC), in organic solvents and water.** *J. Agric. Food Chem.* 25(2): 368-373; 1977. (10 references)

A rapid ultraviolet (UV) spectrophotometric method for determining benomyl and its degradation compound, methyl 2-benzimidazole carbamate (MBC, car-

bendazim), has been developed. Maximum absorbances of a solution containing benomyl and MBC occur at 294 nm (*A*) and 286 nm (*B*), and, from the ratio *A*/*B*, the proportion of intact benomyl and MBC in the solution can be obtained from a standard curve. After determining the proportion of benomyl and MCB in organic solvent s, *n*-butyl isocyanate (BC) is added to the same solution to determine the total quantity of benomyl in the solution. With a nonscanning spectrophotometer, absorption of the sample is measured at 294 nm before and after adding BIC, and organic solvents except methanol and ethanol. (Author abstract reprinted by permission of the American Chemical Society)

77-1146. Holt, R. F.; Pease, H. L. (Biochem. Dep., Res. Div., Exper. Stn., E.I. DuPont de Nemours and Co. Inc., Wilmington, Delaware 19898). **Determination of terbacil and metabolite residues using microcoulometric gas chromatography.** *J. Agric. Food Chem.* 25(2): 373-377; 1977. (4 references)

Residues of terbacil herbicide (3-*tert*-butyl -5-chloro -6- methyluracil) and three metabolites in plant and animal tissues and in soil are determined by initial extraction with chloroform, cleanup by liquid/liquid partitioning steps, and measurement by halogen-sensitive microcoulometric gas chromatography after formation of silyl derivatives of the metabolites. Method sensitivity is 0.04 ppm for all four compounds relative to a 25-g sample. (Author abstract reprinted by permission of the American Chemical Society)

77-1147. Singhal, J. P.; Khan, S.; Basnal, O. P. (Fac. Eng. Technol., Aligarh Muslum Univ., Aligarh, India). **Spectrophotometric determination of oxamyl as copper dithiocarbamate.** *J. Agric. Food Chem.* 25(2): 377-380; 1977. (2 references)

A spectrophotometric method for the determination of oxamyl, a powerful nematocide, in aqueous solutions has been developed. Reaction variables for the formation of a characteristic colored system have been investigated. Average recoveries of oxamyl varied from 88.6 to 97.3% in different kinds of fortified samples in the 2-10-ppm range after a contact of 12 h. The method can be applied with practical utility in the field of soils, plant products, and water. (Author abstract by permission)

77-1148. Thornton, J. S.; Stanley, C. W. (Chemagro Agric. Div., Mobay Chem. Corp., Kansas City, MO 64120. **Gas chromatographic determination of sencor and metabolites in crops and soil.** *J. Agric. Food Chem.* 25(2): 380-386; 1977. (14 references)

A gas chromatographic procedure is described for the analysis of residues of sencor (metibuzin) herbicide and its metabolites in a variety of crops. Conjugated residues are released by refluxing the sample as a part of the initial extraction. Following this, sencor and metabolites are separated by liquid-liquid partition and the two fractions cleaned up individually for electron-capture gas chromatographic analysis. A separate extraction scheme is described for analysis of soil. Considerable effect was made to ensure maximum recovery of residue from field-weathered samples. Recovery of sencor is generally in the 80-100% range with metabolite recoveries averaging somewhat less. The sensitivity limit of the method is 0.01 ppm for sencor and all metabolites. (Author abstract reprinted by permission of the American Chemical Society)

77-1149. Davis, P. L.; Munroe, K. A. (Agric. Res. Serv., Horticultural Res. Lab., Orlando, FL 32803). **Determination of biphenyl by gas and liquid chromatography.** *J. Agric. Food Chem.* 25(2): 426-428; 1977. (11 references)

Citrus fruits in shipping cartons are protected from decay with biphenyl-impregnated pads. Two methods of analyzing the biphenyl content of the pads, by gas and liquid chromatography, were compared and both were satisfactory. Analysis of extracts of whole pads rather than of representative areas is suggested. A method of analysis of biphenyl vapor by gas chromatography was developed. This entailed multiple injections from a heated sampling syringe to overcome the tendency of biphenyl to adhere to the glass. This method should be useful in determining relationships between vapor concentration and fungistatic activity and to atmospheric monitoring. (Author abstract reprinted by permission of the American Chemical Society)

77-1150. Bower, N. W.; Trunk, J. J.; Witt, J. M. (Environ. Health Sci. Cent., Oregon State Univ., Corvallis, OR 97331). **Sample size selection for the analysis of pesticides in tubers.** *J. Agric. Food Chem.* 25(2): 429-431; 1977. (10 references)

The determination of representative sample sizes has long been a problem for the food chemist, particularly where trace constituents are concerned. In this study variations in size and surface area, which are the two significant factors affecting the deviation in the concentration of dieldrin within tubers, are quantitatively measured. These measurements are used to demonstrate a method for predetermining sample sizes. The sample sizes developed in this work are applicable patricularly to Russet potatoes, though a similar approach can be used for any tubers with pesticides randomly distributed primarily in the skin. (Author abstract reprinted by permission of the American Chemical Society)

77-1151. Cessna, A. J. (Agric. Canada Res. Stn., Regina, Saskatchewan, Canada S4P 3A2). **Determination of terbacil in blueberries.** *J. Agric. Food Chem.* 25(4): 432-434; 1977. (7 references)

A method for the analysis of terbacil (3-*tert*-butyl-5-chloro-6- methyluracil) in blueberries, utilizing electron-capture gas chromatographic detection, has been developed and used to determine terbacil residues in both

highbush and lowbush blueberries treated with terbacil alone and terbacil in combination with other herbicides. The maximum terbacil residue found was 2.0 ppb. The limit of detection was 1.0 ppb based on a 25-g sample and recoveries were in the order of 90%. (Author abstract repirnted by permission of the American Chemical Society)

77-1152. Friestad, H. O. (Chem. Res. Lab., Agric. Univ. Norway, 1432 Aas-NLH, Norway). **Evaluation of rapid partitioning cleanup method for pesticides.** *J. Assoc. Off. Anal. Chem.* 60(2): 268-271; 1977. (14 references)

A partitioning cleanup method performed in test tubes with small solvent volumes, and using syringes instead of separatory funnels for phase separations, has been tested for potential as a general cleanup method for a variety of pesticidal compounds. More than 50% recoveries were obtained for most of the 60 compounds tested, even though minimal manipulation rather than maximum recovery was the aim. Since the recoveries usually are constant, procedural losses can be compensated for by correction factors. (Author abstract by permission)

77-1153. Stefanac, Z.; Stengl, B.; Vasilic, Z. (Inst. Med. Res. Occupational Health, Yugoslav Acad. Sci. Arts. Mose Pijade 158, 4100- Zagreb, Yugoslavia). **Quantitative determination of organophosphorus pesticides by thin-layer densitometry.** *J. Chromatogr.* 124(1): 127-133; 1976. (22 references)

Dichlorvos, malathion, and parathion (10 μl) were applied to chromatographic plates coated with silica gel G according to Stahl. The thin-layer chromatograms were developed with chloroform-acetone (1:1) and, in some cases, also with acetone-benzene-*n*-hexane (5:2:13). After development and evaporation of the solvents, some of the chromatograms were sprayed with silver nitrate reagent for detection. Uniformly colored pots (brown for dichlorvos, yellow-brown for trichlorfon, dark yellow for malathion, and pale yellow for parathion) appeared after the plates had been heated for 30 min at 135 C. Densitometric measurements were performed with a VIS light source, using only a primary filter (460-470 nm). In some cases, the developed and dried chromatograms were sprayed with an enzyme solution and then with a substrate solution. Dark violet spots become visible in UV light after a few minutes and optimum values were obtained after 30 min. Densitometric measurements were performed with a VIS Light source using a primary (360 nm) and secondary (415) filter. Parathion and malathion were oxidized by exposing the chromatograms to bromine vapor for 5 min. The plates were sprayed with enzyme solution and substrate solution and light yellow spots on a pink background were measured with a VIS light source using a secondary filter (510 nm). These analytical procedures were successfully applied to the determination of organophosphorus pesticides in an aqueous environment and in toxicological research.

77-1154. Ernst, G. F.; Pieterse, C.; Martens, L. J. H. (Food Inspection Service, Utrecht, The Netherlands). **Comparison of drosophila, rat-liver and bee-head esterases in detecting residues of organophosphorus and carbamate pesticides in vegetables and fruits.** *J. Chromatogr.* 133(1): 245-251; 1977. (11 references)

Organophosphorus and carbamate pesticides were determined in numerous fruits and vegetables using thin-layer chromatography and an enzyme-inhibition technique with drosophila, rat-liver, or bee-head esterases. The limits of detection are presented in nanograms. For most extracts, a limit of detection of 0.01 ppm was achieved, and those extracts which showed interferences on the plate were cleaned up. Bee-head esterase was generally more sensitive. Rat-liver esterase was especially sensitive to inhibition by dithion (coumithoate), V.C. 13 (dichlofenthion) and trichloronate (trichlorfon). The sensitivity to inhibition by butonate and trichlorfon was improved by spraying the plate with 5% ammonia solution instead of exposing it to bromine vapor.

77-1155. Kovac, J.; Henselova, M. (Res. Inst. of Agrochem. Technol., 810 04 Bratislava-Predmestie, Czechoslovakia). **Detection of triazine herbicides in soil by a Hill-reaction inhibition technique after thin-layer chromatography.** *J. Chromatogr.* 133(2): 420-422; 1977. (22 references)

Prometryne, atrazine, and simazine were detected in soil samples by a Hill-reaction inhibition technique using 2,6-dichlorophenolindophenol (DCPIP) as an electron acceptor following thin-layer chromatography on Silufol plates. It was possible to detect 0.1 ppm of the herbicides without the need for a clean-up procedure. The detection is based on the inhibition of the photolytic activity of chloroplasts isolated from bean plants. The reaction comprises the photosynthetic electron transport for light reaction II, during which water is split into hydrogen equivalents and oxygen. It permits nanogram amounts of powerful inhibitors of the photolytic activity of isolated chloroplasts to be detected, i.e., about 40-50% of commercial herbicides.

77-1156. Farwell, S. O.; Bowes, F. W.; Adams, D. F. (Air Pollut. Res. Sect. Dep. Chem. Eng., Washington State Univ., Pullman, WA). **Evaluation of XAD-2 as a collection sorbent for 2,4-D herbicides in air.** *J. Environ. Sci. Health* B12(1): 71-83; 1977. (19 references)

In a new collection method for airborne dichlorophenoxy herbicides, Amberlite XAD-2 solid adsorbent was used to collect 2,4-D compounds efficiently from ambient air. The 2,4-D esters and non-volatile 2,4-D can be recovered selectively from the XAD-2 by sequential solvent desorption, and the extraction procedure is compatible with electron-capture gas chromatographic analysis. The overall sorbent efficiencies for 2,4-D compounds ranged from 81 to 95%.

77-1157. Kiriushina, L. P.; Burkina, I. N. (Azov Sci. Res. Inst. Fish., Rostov-on-Don, USSR). **Identifikatsiia metabolitov baiteksa v vode. [Identification of baytex metabolites in water.]** *Khim. Sel. Khoz.* 14(7): 74-75; 1976. (3 references) (Russian)

Chromatographic methods for the identification and determination of baytex (fenthion) and its metabolites in water are described. After extraction with a 3:1 mixture of chloroform and acetone, chromatographic identification is done on a silica gel plate, using a 9:1 mixture of hexane and acetone as solvent system. After the plate is dried, it is sprayed with a 0.05% solution of bromophenol blue and silver nitrate. After repeated drying at 405C, the plate is sprayed with a 2% solution of crtiic acid or a 5% solution of acetic acid. Five dark blue spots with different Rf appear against a yellow background. The five different compounds are identified by column chromatography, using different solvents for elution. Compound I (baytex, *Rf* 0.6) is eluted with benzene; II (baytex sulfone, *Rf* 1.02) with 1% acetone in benzene; III (baytex solfoxide, *Rf* 0.09) with 7.5% acetone in benzene; IV (baytex oxon, *Rf* 0.12) with 1% acetone in benzene, and V (baytex oxon sulfone, *Rf* 0.18) with 10% acetone in benzene. Analyses carried out 5 days after the addition of baytex to water revealed that baytex accounted for 88%, the sulfone for 8%, the oxy analog for 1.6%, and the sulfoxide plus the sulfone of the oxy analog of baytex for 1.2½.

77-1158. Tret'iak, M. G. (Inst. Organ. Chem., Ukrainian SSR Acad. Sci., Kiev, USSR). **Khromatofotokolorimetricheskoe opredelenie saifosa v sakharnoi svekle. [Chromatophotocolorimetric determination of sayfos in sugar beets.]** *Khim. Sel. Khoz.* 14(7): 75-76; 1976. (2 references) (Russian)

Qualitative thin-layer chromatographic and quantitative photocolorimetric determination of sayfos (menazon) in leaves, roots and seeds of sugar beets are described. After extraction with acetone, and clean-up, the sample is applied on alumina layer, using acetone as a solvent for qualitative determination. The plate is sprayed with 0.1% palladium chloride solution for visualization; sayfos appears in the form of lemon yellow spots. The sensitivity of the method is 0.02 mg/kg. For quantitative determination, the substance is scraped off from the plate, combined with potassium persulfate, and molybdenum reagent and ascorbic acid are added for photocolorimetric determination. The recovery rate is at least 80%; the sensitivity amounts to 0.7 mg/kg.

77-1159. Samosvat, L. S.; Uskova, L. A.; Raskin, M. S. (Kiev State Inst. Postgrad. Med. Stud., Kiev, USSR). **Opredelenie dialena v rasteniiakh i zerne metodom tonkosloinoi khromatografii. [TLC determination of dialen in plants and grains.]** *Khim. Sel. Khoz.* 14(7): 76-77; 1976. (8 references) (Russian)

Thin-layer chromatographic method for the stimultaneous determination of Dialen (10:1 mixture of 2,4-D and dicamba) in plants and grains is described. After extraction with diethyl ether, and reextraction with a 1:1 mixture of 0.5% aqueous solution of sodium hydroxide and 20% potassium chloride solution, and with chloroform, the substances are crystallized, and their purity is determined by measuring the melting points. Chromatographic determination is done on silica gel, using a 15:1 mixture of chloroform and glacial acetic acid after chromatographic clean-up with the above solvent system with acetone. The spots of 2,4-D and dianate are visualized by spraying with silver ammoniate solution and subsequent exposure to UV light. The recovery rate was found to be 75-85%. The sensitivity of the method amounts to 3-5 μg.

77-1160. Knyr, L. L.; Sokolov, M. S.; Perfilova, N. V.; Sukhoparova, V. P. (Inst. Farm Chem. Soil Sci., USSR Academy of Sciences, USSR). **Metody opredeleniia propanida, linurona i 3,4-dikhloranilina v vode, pochve i donnykh otlozheniiakh. [Method for determining propanide, linuron, and 3,4-dichloroaniline in water, soil, and benthic sediments.]** *Khim. Sel. Khoz.* 14(9): 65-68; 1976. (10 references) (Russian)

Colorimetric and thin-layer chromatographic methods for the determination of Propanide (propanil), linuron, and their metabolite, 3,4-dichloroaniline, in water, soil, and in benthic sediments are described. Acetone is used for extraction from water, and reextraction with chloroform is necessary for soil samples. For colorimetric determination, propanil and linuron are hydrolyzed to 3,4-dichloroaniline in a short time, and the latter is diazotized and conjugated with α-naphthol. The extinction is measured photocolorimetrically at 510-515 nm. Thin-layer chromatographic determination is done on Silufol or silica gel plates, using a 60:1.5 ratio mixture of benzene and acetone as a solvent system. The plates are sprayed with 1-naphthylethylene diamine for azo conjugation. The sensitivity of the photocolorimetric method amounts to 0.5-1 mg/kg in soil, and to 0.005-0.01 mg/l in water. The sensitivity of the thin-layer chromatographic method is 5-10 μ in soil and 0.5 μ in water. Parallel chromatographic and photometric determination is recommended whenever the specific residue in the sample is unknown.

77-1161. Zamanskaia, I. Sh.; Gar, K. A.; Medved', V. N. (All-Union Sci. Res. Inst. Plant Protect., USSR). **Opredelenie ostatkov geterofosa v ovoshchakh. [Determination of heterophos residues in vegetables.]** *Khim. Sel. Khoz.* 14(9): 77-78; 1976. (Russian)

A gas chromatographic method for the determination of residues of heterophos (*O*-ethyl-*O*-phenyl-*S*-propylthiophosphate) in scallions, cucumbers and tomatoes, and a hothouse study on the residue dynamics of heterophos in these plants are described. After extraction with hexane-acetone (7:3), the residue is determined by gas-chromatography with a thermionic detector without clean-up of the extract. The sensitivity of the method amounts to 0.01 mg/kg; the recovery rate was 87±4% in

cucumbers, 78±7% in tomatoes, and 82±5% in scallions. Young scallion, cucumber and tomato plants planted in a soil one week after treatment with heterophos at doses of 10-40 kg/ha contained not more than 0.05 mg/kg heterophos 1.5 months after soil treatment. Within this period, the residue levels were highest in cucumbers. Scallions grown in soils treated with 10, 20 and 40 kg/ha doses contained 0.03, 01. and 0.4 mg/kg heterophos 20 days after the soil treatment. The findings indicate that the necessary waiting period between soil treatment and harvesting should be 50-55 days.

77-1162. Mel'tser, F. R.; Novikova, K. F.; Kuznetsova, Z. V. (All-Union Sci. Res. Inst. Chem. Plant Protect., USSR). **Otdelenie polikhlorirovannykh bifenilov ot khlororganicheskikh pestitsidov pri gazokhromatograficheskom opredelenii poslednikh v ob'ektakh okruzaiushchaia sredy. [GLC determination of PCBs and organochlorine pesticide residues in environmental materials.]** *Khim. Sel. Khoz.* 14(10): 69-73; 1976. (7 references) (Russian)

A procedure for the extraction, cleanup, and gas-chromatographic determination of organochlorine pesticide residues in the presence of polychlorinated biphenyls (PCBs) is described. Following extraction with hexane, the extract is applied to a silica-filled column, from which PCBs are eluted with petroleum ether and organochlorine pesticides are eluted with a 4:1 mixture of methylene chloride and hexane. The organochlorine pesticides are eluted onto a gas chromatograph with electron capture detector. The sensitivity of the method amounts to 0.01 ng for α-BHC, lindane, and heptachlor, and to 0.02 ng for *p,p'*-DD (TDE) and *p,p'*-DDT. The retention times are 68 sec for α-BHC, 80 sec for lindane, 132 sec for heptachlor, 272 sec for *p,p'*-DDE, 345 sec for *p,p'*-DDD TDE, and 440 sec for *p,p'*-DDT.

77-1163. Samosvat, L. S.; Kofman, I. Sh.; Kunak, V. D. (Kiev State Inst. Postgrad. Med Stud., Kiev, USSR). **Khromatograficheskoe opredelenie eptama, tillama i ronita v pochve i sakharnoi svekle. [Chromatographic determination of EPTC, tillam, and cycloate in soil and sugar beets.]** *Khim. Sel. Khoz.* 14(12): 52-53; 1976. (10 references) (Russian)

A thin-layer chromatographic method for the determination of EPTC, tillam and cycloate in soil and in the leaves and roots of sugar beets is described. Extraction is done with acetone. Chromatographic determination is done on KSK silica gel, using a 4:1 mixture of hexane and ether as a solvent system. The plates are exposed to chlorine gas for 30 sec, after which they are sprayed with iodine-starch reagent (1% solution of potassium iodide with 3% freshly prepared starch solution and ethanol) or with toluidine reagent (*o*-toluidine in 1*N* acetic acid with 10% sodium tungstate solution, acetone, and potassium iodide). The residues appear in the form of dark blue spots (with the iodine-starch reagent) or of grayish blue spots (with the toluidine reagent) against a white background. Quantitative determination is done by peak and color intensity comparison. The sensitivity of the method amounts to 3-5 μ in the sample, corresponding to 0.03-0.05 mg/kg in soil, 0.06-0.1 mg/kg in sugar beet roots, and 0.1-0.2 mg/kg in beet leaves. The recovery rate is 80-90%.

77-1164. Kiryushina, L. P. (Azov Sci. Res. Inst. Fish., Rostov-on-Don, USSR). **Khromatograficheskoe opredelenie ostatkov bazudina v pochve, vode i rybe. [Chromatographic determination of basudin residues in soil, water, and fish.]** *Khim. Sel. Khoz.* 14(12): 54; 1976. (1 reference) (Russian)

Thin-layer chromatographic method for the determination of basudin (diazinon) in soil, water, and fish is described. After extraction with *n*-hexane, the residue is determined on a silica gel plate, using an *n*-hexane-acetone mixture (9:1) as a solvent system. The plate is sprayed with bromphenol blue and silver nitrate solutions, and then with 2% citric acid or 5% acetic acid solution for background color suppression. Diazinon forms dark blue spots against a yellow background. The sensitivity of the method is 2 μ in the water sample and 5μ in soil and fish. The *Rf* value of diazinon is 0.35, that of its metabolite is 0.14. Fenthion, methyl parathion, ronnel, dimethoate, dichlorvos, phosalone, and fenitrothion do not interfere with the determination, but trichlorfon and phthalophos (phosmet) do.

77-1165. Franke, J. P.; Zeeuw, R. A. (Afd. Toxicol., Lab. Farm. Anal. Chem., Rijksuniv. Groningen, Groningen, The Netherlands). **Differentiele puls heroplossingsvoltammerrie bij het opsporen van acute en chronische thalliumintoxicaties. [Differential pulse solution voltammetry in detecting acute and chronic thallium poisoning.]** *Pharm. Weekbl.* 111(30): 725-734; 1976. (16 references) (Dutch)

Differential pulse anodic stripping voltammetry is reviewed. With this technique it is possible to identify and determine heavy metals in the microgram to picogram range. The technique has been applied to the direct determination of thallium in urine, blood plasma and hemolyzed blood without sample destruction. The differential pulse technique increases the sensitivity of DC anodic stripping voltammetry so that sample sizes can be reduced to 2 ml or less. The hanging mercury drop electrode and the mercury film electrode were compared. The former was found to be very suitable for routine analysis of acute poisoning cases, with detection limits in the submicrogram range. The latter electrode is more sensitive, with detection limits in the picogram range, and can be used for the detection of chronic poisoning. A proper choice of operating conditions eliminates metallic interferences, thus giving the method a high degree of specificity.

77-1166. Desmarchelier, J. M.; Wustner, D. A.; Fukuto, T. R. (Div. Entomol., CSIRO, Canberra, Australia). **Mass spectra of organophosphorus esters and their alteration products.** *Residue Rev.* 63: 77-185; 1975. (161 references)

Mass spectra are presented for 54 organophosphate pesticides. The production and factors affecting the intensity of the molecular radical ion are discussed, as is the reproducibility of mass spectra of OP esters. Following a general discussion of the mass spectral fragmentation of OP esters the mass spectra of phosphinates, phosphonates, phosphates, phosphorothiolates, phosphorothionates and phosphorodithioates and OP esters with a phosphorus-nitrogen single bond are analyzed. (Author abstract by permission)

77-1167. Totir, N.; Marchidan, S.; Volanschi, C.; Cimpoeru, N.; Andrei, R.; Funduc, I. (Cent. Phys. Chem., Bucharest, Romania). **Quantitative determination of trace amounts of *s*-triazine herbicides in waste waters by physico-chemical methods.** *Rev. Roum. Chim.* 22(1): 137-145; 1977. (16 references)

A comparative study of physico-chemical determination of *s*-triazine herbicides in waste waters is given. Among the procedures applied for carrying out the extraction, the method with methylene chloride as solvent gave the best results. A complex mixture of *s*-triazine herbicides in very dilute aqueous solutions can be properly analyzed only by applying the gas-chromatographic method.

77-1168. Zadrozinska, J. (Dep. Food Anal., Nat. Inst. Hyg., Warsaw, Poland). **Zastosowanie chromatografii gazowej do oceny metody enzymatyznej opracowanej do oznaczen pozostalosci insektycydow fosforoorganicznych w owocach i warzywach. [Application of gas chromatography for evaluation of an enzymatic method elaborated for determination of organic-phosphorus insecticides residues in fruit and vegetables.]** *Roczn. Panstw. Zakl. Hig.* 27(4): 391-401; 1976. (13 references) (Polish)

An enzymatic method using thin layer chromatography to detect organic-phosphorus insecticides residues in fruits and vegetables was evaluated by comparison to gas chromatography. Separation and identification of organic-phosphorus insecticides and their toxic metabolites in standard solutions and quantitative assessment of the recovery of inseciticides from their residues in vegetable material were compared using dichlorvos and malathion as examples. Determinations were carried out with a Pye apparatus with a thermionic detector using Gas Chrom Q 80/100 mesh as a carrier for column filling. The following parameters were taken into account in the investigations: the type of liquid phase (DC-200 and OV-101), column length (1.524 m and 2.133 m), column temperature (130°-200°) and the rate of argon flow (30, 40 and 60 ml/min.) at a stable temperature of the detector: 200°, stable air flow rate (350 ml/min.) and stable background current value (30-40% of the scale at damping value 1 x 10^2A). Under these conditions only 9 out of 16 tested compounds were separated, while by the enzymatic method using thin layer chromatography it was possible to separate and identify all tested insecticides. The recovery of insecticides in gas chromatography was tested on vegetable material in 3 concentrations: 0.1, 0.05 and 0.01 mg/kg of vegetables. For malathion this value ranged from 88% to 100% and for dichlorvos from 76.4 to 96%.

77-1169. Leshchev, V. V.; Talanov, G. A. (All-Union Sci. Res. Inst. Vet. Sanit. USSR). **Opredelenie FOS v kormakh i produktakh. [Determination of organophosphorus compounds in feed and food products.]** *Veterinariya* 9: 82-83; 1976. (Russian)

A method for the detection of organophosphorus pesticide residues in plants, feed, and in food products of vegetable and animal origin is described. After extraction with acetone (2x), chloroform, ethanol and chloroform, the latter extract is evaporated, the dry residue is taken up in acetone, and applied on dry indicator paper that had been treated with bromthymol blue in sodium hydroxide and with acetylcholine chloride solution. The indicator paper is dried, after which it is sprayed with 50% horse serum, and exposed to 40°C for 15 minutes. Organophosphorus compounds will appear in the form of dark blue rings or spots against a yellow background. The limits of detectability are 0.01 mg/kg for fenthion, valexon, dichlorvos, diazinon, amidophos, ronnel, trichlorometaphos-3, phosalone and crotoxyphos; 0.02 mg/kg for fenitrothion, and 0.05 mg/kg for chlorpyritos, malathion, methylparathion, trichlorfon, and phosmet.

77-1170. Woidich, H.; Pfannhauser, W. (Forschungsinst. Ernaehrungswirtsch., Vienna, Austria). **Duennschichtchromatographische Trennung und quantitative Direkt-Auswertung einiger zinnorganischer Verbindungen. [Separation and quantitative "in situ" determination of organotin compounds on TLC plates.]** *Z. Lebensm. Unters. Forsch.* 162(1): 49-54; 1976. (13 references) (German)

Isopropanol was used to extract residues of organotin compounds in feed and food. Clean up by means of a Sephadex LH-20 column and separation of the compounds on silicagel-G thin layer plates by 4-methylpentanone (2)/pyridine/acetic acid (97.5 + 1.5 + 1) was achived. The thin layer plates were scanned directly, using a chromatogram spectrophotometer to quantitatively determine the triphenyl- and tricyclohexyltin fungicides.

77-1171. Sobina, N. A.; Kheifets, L. M.; Bondarenko, L. M.; Glyadyaeva, L. A. (All-Union Sci.-Res. Inst. Water Prot., Kharkov, USSR). **Polyarograficheskoe opredelenie metafosa v vodakh sispol'zovaniem nesmeshivayushikhsya s vodod rastvoritelei. [Polarographic determination of O,O-dimethyl-O- (4-nitro -3-**

methylphenyl)-thiophosphate (metaphos) by using water-immiscible solvents.] *Zh. Anal. Khim.* 31(5): 941-945; 1976. (5 references) (Russian)

Water-immisicible solvents (butanol, isobutanol) were used for polarographic determination of metafos (methyl parathion). The simultaneous use of these solvents as the extractants makes it possible to increase the sensitivity of polarographic determination of metafos and extend the applicable of polarographic techniques to the determination of microquantities of organic substances in water.

See also **77-0988** **77-0989** **77-1010** **77-1054**

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